



Health Care Cost Drivers

**Strategic Services Division
Alberta Health**

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Executive Summary

Sustainability of Alberta's public health-care system has been the topic of much conversation in recent years, a conversation that is more important than ever given current fiscal challenges. Provincial government health expenditures in Alberta have increased by 10 per cent annually in the last decade. The difference between the rate of growth in health care spending, and that of volatile government revenues and economic growth pressures, is jeopardizing the fiscal sustainability of the public health care system. If the difference in these rates of growth persist over the long term, then current and future obligations will become increasingly difficult to meet.

To explore the sustainability issue, this report examines the cost drivers of provincial health spending in three areas of Alberta's health system over the past 10 years: hospitals, physicians and drugs. These sectors represent about 46 per cent, 19 per cent, and seven per cent of Alberta's total government health expenditures, respectively. The report also examines cross-provincial variations in health system productivity and efficiency, and presents 10-year projections of total provincial government health expenditures.

Major findings include:

- From 2000-01 to 2010-11, provincial government health expenditures grew at an average annual rate of 10.4 per cent¹, faster than the average growth rate of total government revenues at 3.2 per cent and GDP at 6.2 per cent;
- Over the same ten-year period, the annual growth rate for physicians' spending was 12.4 per cent, the annual growth rate for hospital spending was 11.0 per cent, and drug expenditures grew by almost 9.4 per cent;
- Hospital, physician and drug spending accounted for a combined 72 per cent of total provincial health spending in 2010-11, up from 65 per cent in 2000-01;
- The major cost drivers on health expenditures are wages and compensation, continuing shift to more expensive drugs, population growth, an aging population and other factors such as technology, non-wage inflation and others;

¹ Considering the new CIHI estimates for 2011-12 and 2012-13, the average annual growth rate for the 2002-03 to 2012-13 period is estimated to be 8.6 per cent.

- Alberta's age-gender adjusted per capita provincial health spending remains significantly higher than the national average (approximately 35 per cent higher in 2010), suggesting that Alberta is among the highest spenders compared to other provinces;
- Alberta had the second highest cost among provinces – at \$5,769 – to treat the average acute care inpatient in 2009, 12 per cent higher than the national average;
- The percentage of seniors is projected to increase from approximately 11 per cent in 2011 to 15 per cent in 2021. By 2031, it is projected there will be more than 923,000 seniors in Alberta, or about one in five Albertans, leading to concerns about greater demand for health care;
- Wage inflation was the largest contributor to hospital expenditure growth from 2005-06 to 2009-10 at 30 per cent;
- The largest contributor in physician expenditure growth from 2005-06 to 2010-11 period was wage inflation, which accounted for 39 per cent of the increase; followed by population growth and aging; and
- Drug expenditures increased at an average annual rate of 6.2 per cent from 2004-05 to 2010-11. Drug mix impact – changes in the type of drugs used for treatment – was the main driver of drug spending growth during this time.

Perhaps most significantly, the report shows that under current policies and spending patterns, total government provincial health spending is projected to see an average annual increase of somewhere between seven per cent and 10 per cent to 2021-22. This means that health spending will more than double in the next 10 years, reaching anywhere between \$34 billion and \$44 billion. Under the cost drivers model, per capita provincial government health spending in 2021-22 is projected to reach \$9,912 in Alberta and \$5,943 at the national level. This rise in health spending will be at a faster rate than the projected growth in the Alberta economy. While long-term projections are inherently subject to uncertainty, these projections could be regarded as a reasonable indication of the future path in provincial health care spending under current policies and from today's perspective.

Moving forward, the findings of this cost drivers report will be used as a policy development resource and will guide health system decision-making.

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1. INTRODUCTION

The financial sustainability of health systems at the provincial and national level requires governments to finance health care adequately in the face of growing cost pressures, population aging, new technologies and consumer expectations around health care coverage and quality. Governments, both provincial and federal, are concerned about the ability to balance rising cost pressures against limited resources.

Provincial government health expenditures^{2,3} in Alberta more than doubled over the last decade, increasing from \$6.3 billion in 2000-01 to \$17.1 billion in 2010-11. This represents an average annual increase of 10.4 per cent⁴ during this period.^{5,6}

The compilation of this report included a comprehensive literature review of existing research on health care cost drivers. This review identified possible causal relationships between health expenditures and a series of cost drivers. This report builds on prior Ministry work on cost drivers for physician, hospital and drug sectors.

The next sections of this report provide insight on health care fiscal sustainability, historical trends in health care spending by major sectors, cost drivers analysis by major sectors, productivity and efficiency review, and health expenditure projections. In the projections section, three different forecasting approaches are used to validate the forecasts. These include the factor decomposition approach which is the primary approach in this report, followed by a simple extrapolation forecast using historical data, and the Alberta Health Services (AHS) 2030 planning model approach. The projections among the three approaches are then compared for consistency. The last section provides the conclusion.

² Throughout this report, the terms “costs”, “expenditures”, and “spending” are used interchangeably.

³ Here, provincial government health expenditures include capital spending. Capital spending increased annually by 13.5 per cent in the 2000-01 to 2010-11 period.

⁴ Compound Annual Average Growth Rate.

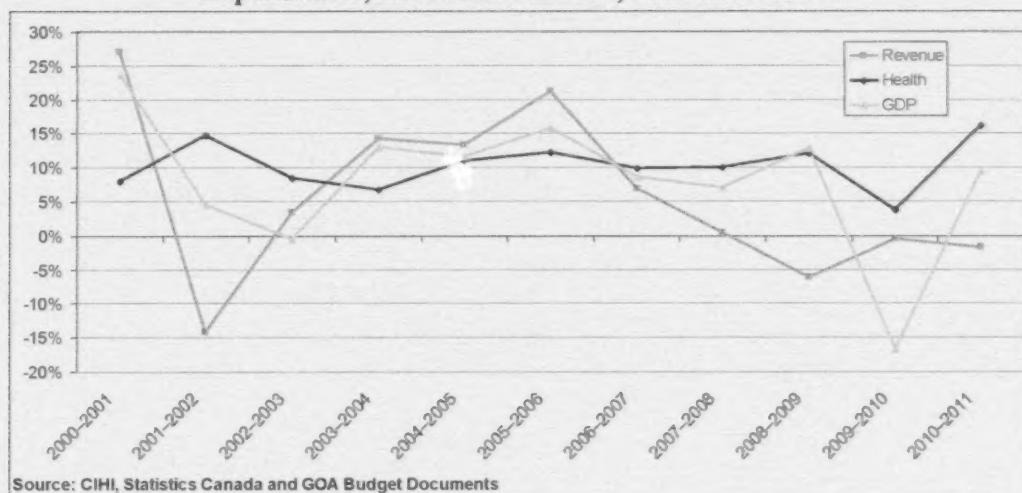
⁵ Considering the new CIHI estimates for 2011-12 and 2012-13, the average annual growth rate for the 2002-03 to 2012-13 period is estimated to be 8.6 per cent.

⁶ The average annual growth rate for real per capita provincial government health expenditure (in 1997 dollars) is 4.1 per cent for the same period.

2. FISCAL SUSTAINABILITY

During the period 2000-01 to 2010-11, provincial government health expenditures grew at an average annual rate of 10.4 per cent which was faster than the average rate of growth in total government revenues (at 3.2 per cent) and GDP⁷ (at 6.2 per cent) during this period (See Figure 1).⁸ If the difference in these rates of growth persist over the long term, then current and future obligations will become increasingly difficult to meet.

Figure 1: Annual Growth Rates in Alberta's Provincial Government Health Expenditures, Revenues and GDP, 2000-01 to 2010-11



Alberta's per capita provincial government health spending rose from \$2,068 in 2000 to \$4,437 in 2010⁹ (see Figure 2). Rapid growth in Alberta's provincial health spending over the last decade resulted in Alberta's per capita figures diverging from the national average over the course of this time period. In 2000, Alberta and Canada's per capita spending were roughly the same. By 2010, however, Alberta's per capita spending was already 20 per cent higher than the national average.

⁷ GDP is Gross Domestic Product at Market Prices, Current Dollars.

⁸ The peak in Alberta's provincial health expenditure growth in 2010-11 is due to AHS receiving a new five-year funding commitment which included a one-time funding of about \$750 million to eliminate its accumulated deficit. There was also a substantial increase of about \$250 million for physician compensation and development that year. The drop in GDP in 2009-10 was due to global economic recession.

⁹ 2010 is the latest year of actual data available for both unadjusted and age-gender adjusted per capita spending figures. Source: CIHI National Health Expenditure Trends Report 1975-2012.

Figure 2: Per Capita Health Spending, Alberta vs. Canada, 2000-2010

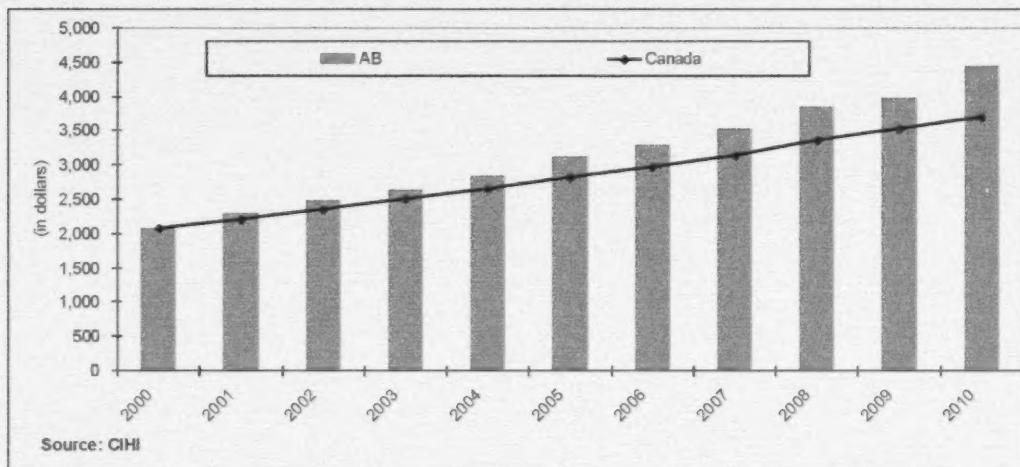
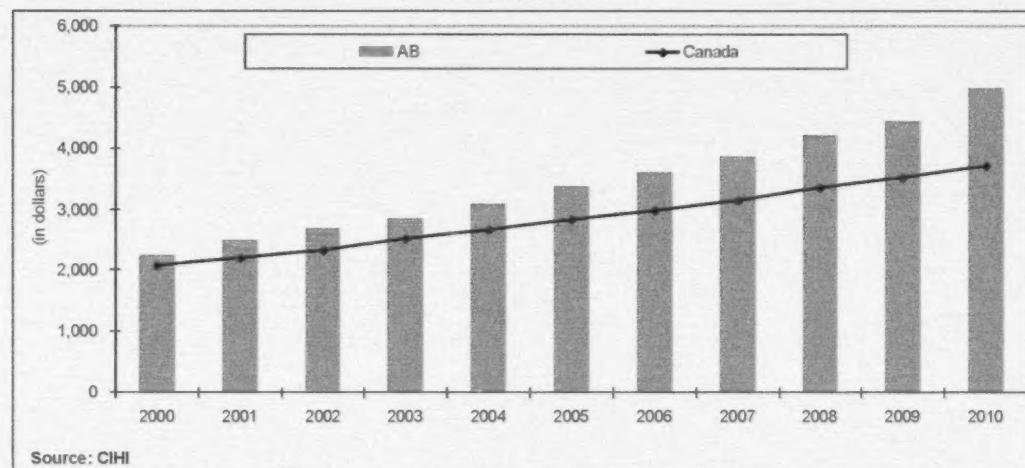


Figure 3 shows the age-gender standardized per capita provincial health spending for Alberta and Canada from 2000 to 2010. Standardizing expenditures to a common population distribution (such as the national population) eliminates the effect of demographic differences, which account for some of the variation in health spending across provinces. Expenditure standardization enables us to measure differences that result purely from utilization and prices. As shown in the chart, Alberta's age-gender adjusted per capita provincial health spending remains significantly higher than the national average (about 35 per cent difference from the national average by 2010). Such high spending suggests that, despite its relatively younger population, Alberta is among the highest per capita spenders compared to other provinces.

Figure 3: Age-Gender Adjusted Per Capita Health Spending, Alberta vs. Canada, 2000-2010



Alberta's health workforce is made up of approximately 120,100 individuals in 2011¹⁰. Table 1 shows that, on average, Alberta's health workforce is better compensated than in other jurisdictions, with Alberta physicians earning 30 per cent and 14 per cent more than the national average on Fee-For-Service (FFS) payments and clinical (FFS + Alternative Payment Programs) payments, respectively. Growth in average weekly (non-farm) wage rate in AB is also the highest in the country and in 2012, compensation rates of the general workforce in Alberta were approximately 21 per cent higher than the Canadian average.

Table 1: Physician Payments and Maximum Hourly Salaries for RNs

Indicators	AB	Canadian Average	Highest	Lowest	AB's rank
Average Gross FFS ¹¹ Payment Per Physician, 2010-11	\$395,281	\$303,125	AB	QC	Highest
Average Gross Clinical ¹¹ Payment Per Physician, 2010-11	\$349,655	\$307,482	AB	PEI	Highest
Maximum Hourly Salary for RNs (as of Oct. 4, 2012)	\$45.03	\$38.73	AB	QC	Highest

Sources: CIHI and Canadian Federation of Nurses Union

¹⁰ Source: Survey of employment, payrolls and hours, Statistics Canada. This figure includes all employees in ambulatory health care services, hospitals and nursing and residential facilities, and excludes those in social services

¹¹ Average payment per full-time equivalent (FTE) physician.

The latest long-term economic outlook by the Conference Board of Canada shows that Alberta's economy is expected to moderate from recent years, with real GDP growing at a healthy pace of 3.5 per cent during the 2013-2018 forecast horizon¹² (see Table 2). Wage growth during this period is also forecasted to average 3.4 per cent during the forecast horizon. However, there are significant risks to the outlook. For one, slowing growth in emerging economies combined with a vulnerable U.S. economy could put further downward pressure on global commodity prices. Moreover, rising North American oil supplies and lack of pipeline access to alternate markets pose significant revenue risks as well. These risks threaten to adversely impact Alberta's ability to meet future obligations should the recent historical trend in health care spending growth continue.

Table 2: Alberta Key Economic Indicators

	2010	2011F	2012F	2013F	2014F	2015F	2016F	2017F	2018F
Nominal GDP Growth (%)	8.0	7.8	5.9	7.2	6.2	5.8	5.6	5.1	4.8
Real GDP Growth (%)	3.8	3.1	3.6	4.5	3.7	3.3	3.2	3.2	3.0
Employment Growth (%)	-0.4	3.7	3.9	2.4	2.0	1.8	1.3	1.2	1.2
Unemployment Rate (%)	6.5	5.5	5.1	4.7	4.3	4.0	3.9	4.0	3.9
Average Weekly Earnings (%)	1.7	2.4	3.5	3.6	3.4	3.5	3.4	3.3	3.2
CPI Inflation Rate (%)	1.0	2.4	2.0	2.3	2.2	2.0	2.1	2.2	2.2
Population Growth (%)	1.4	1.5	2.1	1.9	1.8	1.7	1.7	1.7	1.6

Source: Conference Board of Canada's Provincial Outlook 2012: Long-Term Economic Forecast

3. HISTORICAL TRENDS

Figure 4 shows the shares of major spending categories to Alberta's total provincial government health spending between 2000-01 and 2010-11¹³. Hospital, physician and drug spending accounted for a combined 72 per cent of total provincial health spending in 2010-11. Rapid growth in spending in these three categories drove the combined share to increase from 65 per cent in 2000-01 to 72 per cent in 2010-11.

¹² Conference Board of Canada's 2012 long-term economic forecast was completed in November 2011.

¹³ Other includes spending on other health institutions, administration, capital and other health spending.

Figure 4: Distribution of Alberta Provincial Government Health Expenditures by Major Sectors, 2000-01 – 2010-11¹⁴

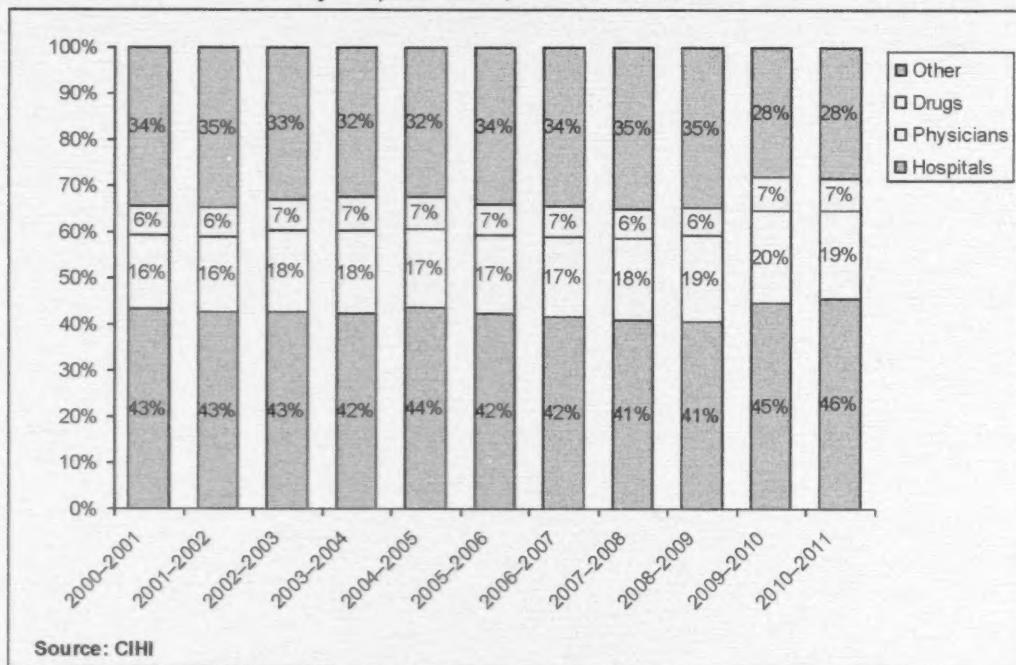


Figure 5 shows the average annual growth rates in spending in the three major health sectors for the last 10 years compared to Alberta and Canada's total health spending. As shown in the chart, the annual growth rate for hospital spending was 11.0 per cent which represents an increase from \$2.7b in 2000-01 to \$7.8b in 2010-11.

The annual growth rate for physicians spending was 12.4 per cent (from \$1.0b in 2000-01 to \$3.3b in 2010-11) which is higher than both hospital and drug spending.

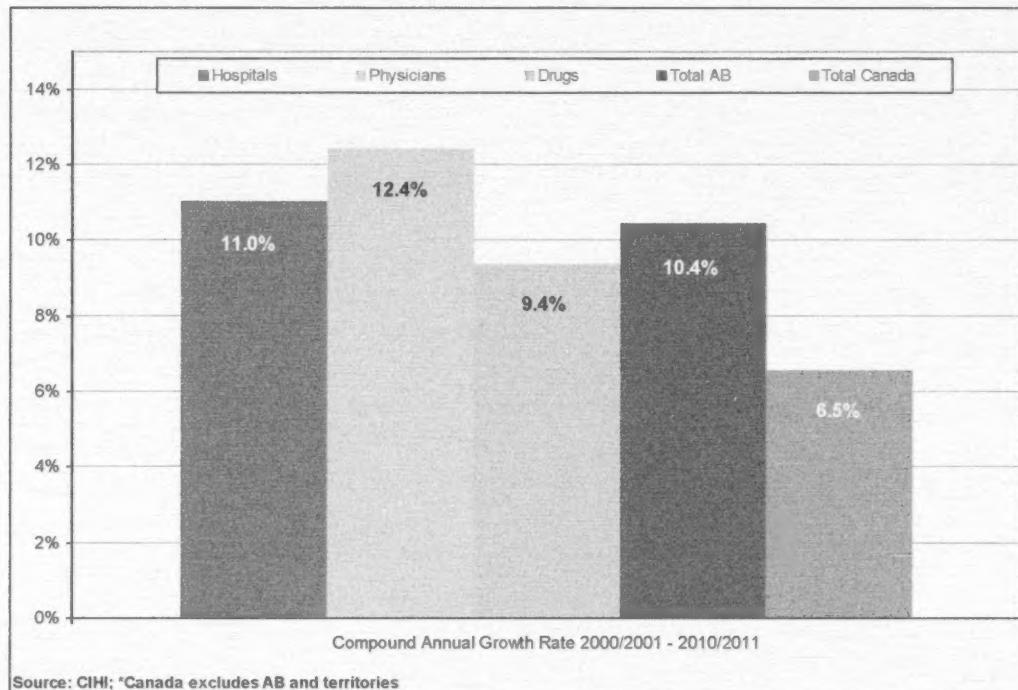
Drug expenditures grew by almost 9.4 per cent¹⁵. Shifts in drug development leading to the introduction of biological medications have contributed to much of the observed increase in expenditures over the past decade. These newer drugs represented a significant cost driver (drug mix) and its effect was partly mitigated by savings that resulted from the recent expiry of blockbuster drug patents.

¹⁴ Note: The numbers may not add up to 100% due to rounding.

¹⁵ In 2009-10, there were changes in financial responsibility of \$90m for Cancer Therapy Drugs and \$64.5m for Specialized High Cost Drugs which were moved from AHS budget to Alberta Health budget. Therefore, CIHI's drug spending growth in 2009-10 was adjusted in this report.

Average annual growth rate in Alberta's total provincial government health expenditure (10.4 per cent) has been higher than that of the Canadian average (6.5 per cent) over the last 10 years.

**Figure 5: Average Annual Growth Rate in Provincial Government Expenditure,
2000-01 to 2010-11**

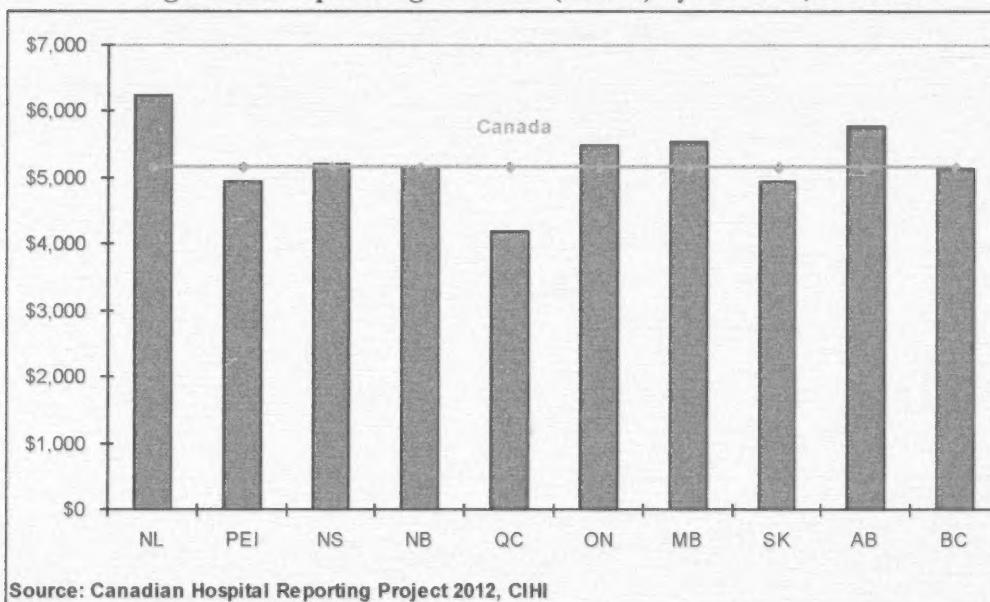


4. PRODUCTIVITY & EFFICIENCY

Given the historical trend in Alberta's government healthcare expenditures over the last decade, there have been questions on productivity and efficiency in the health care system. This section presents Alberta's current state of health system productivity and efficiency compared to other provinces and the national average¹⁶ (please see Appendix D for a list of statistics and indicators in Alberta compared to other provinces). These selected measures can show how the province is doing and identify areas of potential improvement.

1. Cost per Weighted Case (CPWC) is an indicator that measures the relative cost-efficiency of a hospital's ability to provide acute inpatient care. It measures the full cost of treating the average acute care inpatient. A high cost per weighted case indicates a relative high cost of treating the average acute inpatient; a low cost per weighted case indicates the cost of treating the average acute inpatient is relatively lower. In a health care setting, efficiency is increasing when expenses are reduced to achieve the same health outcomes. As shown in Figure 6, Alberta had the second highest CPWC among provinces with \$5,769 which was 12 per cent higher than the national average with \$5,169 in 2009.

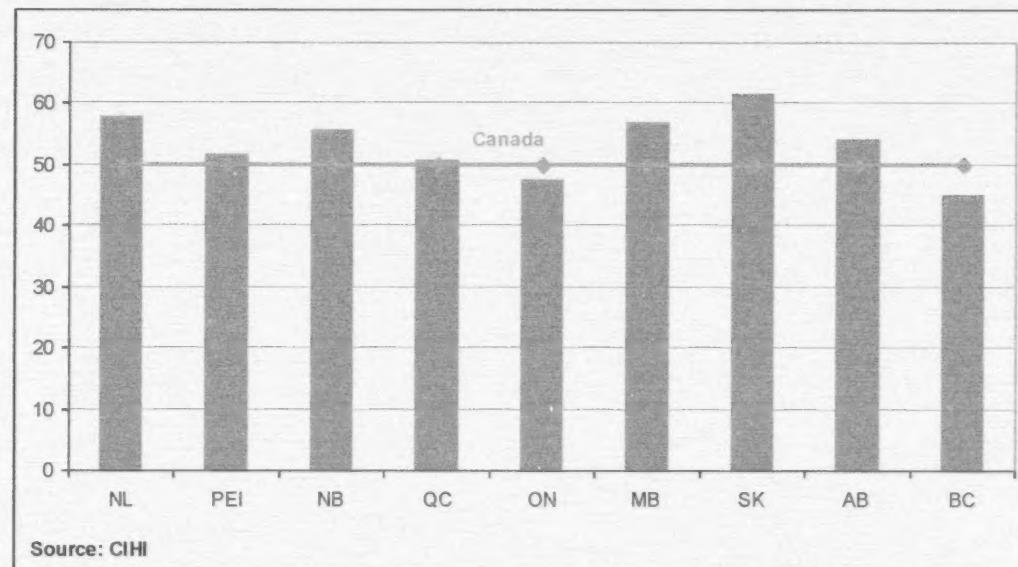
Figure 6: Cost per Weighted Case (CPWC) by Province, 2009



¹⁶ National average includes all provinces and territories.

2. Total Worked Hours per Weighted Case in Nursing Inpatient Service measures the number of worked hours from nursing units in hospital to produce a weighted case. A lower rate is more desirable. Figure 7 shows Alberta had the 5th highest total worked hours per weighted case in nursing inpatient service in 2009 which was 9 per cent higher than the national average.

Figure 7: Total Worked Hours per Weighted Case in Nursing Inpatient Service, 2009

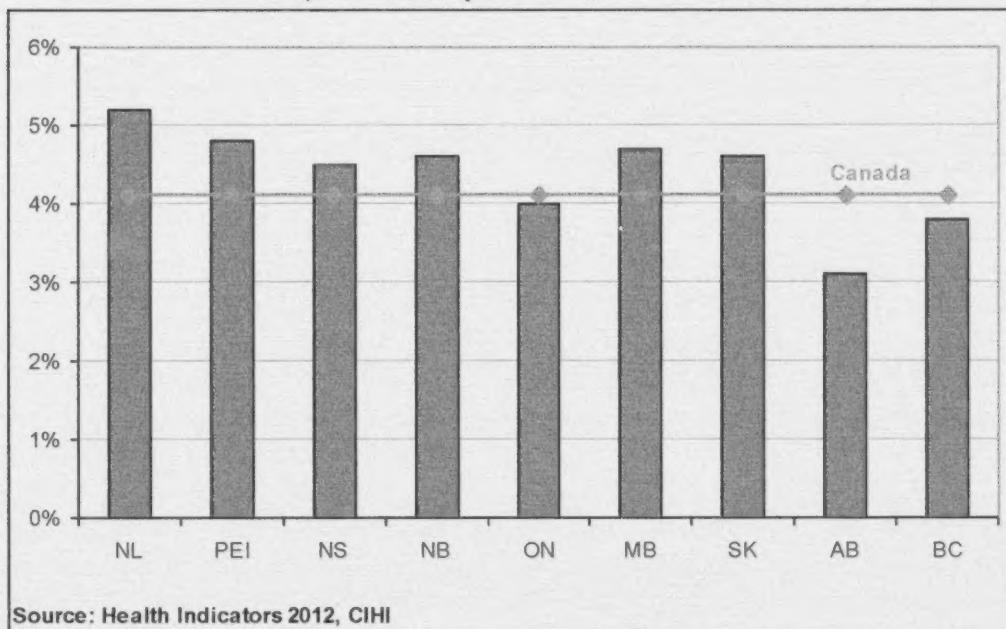


3. 30-Day Acute Myocardial Infarction (AMI) Readmission Risk-Adjusted Rate¹⁷ provides a measure of quality of care. The risk of readmission following an AMI may be related to the type of drugs prescribed at discharge, patient compliance with post-discharge therapy, the quality of follow-up care in the community or the availability of appropriate diagnostic or therapeutic technologies during the initial hospital stay¹⁸. Figure 8 shows Alberta had the lowest 30-day AMI readmission risk-adjusted rate in Canada in 2010-11 which was 24 per cent lower than the national average.

¹⁷ Risk-adjusted rate of unplanned readmission following discharge for AMI. A case is counted as a readmission if it is for a relevant diagnosis and occurs within 30 days after the index AMI episode of care.

¹⁸ Health Indicators 2012, CIHI.

**Figure 8: 30-Day Acute Myocardial Infarction (AMI) Readmission
Risk-Adjusted Rate by Province, 2008-09 – 2010-11¹⁹**

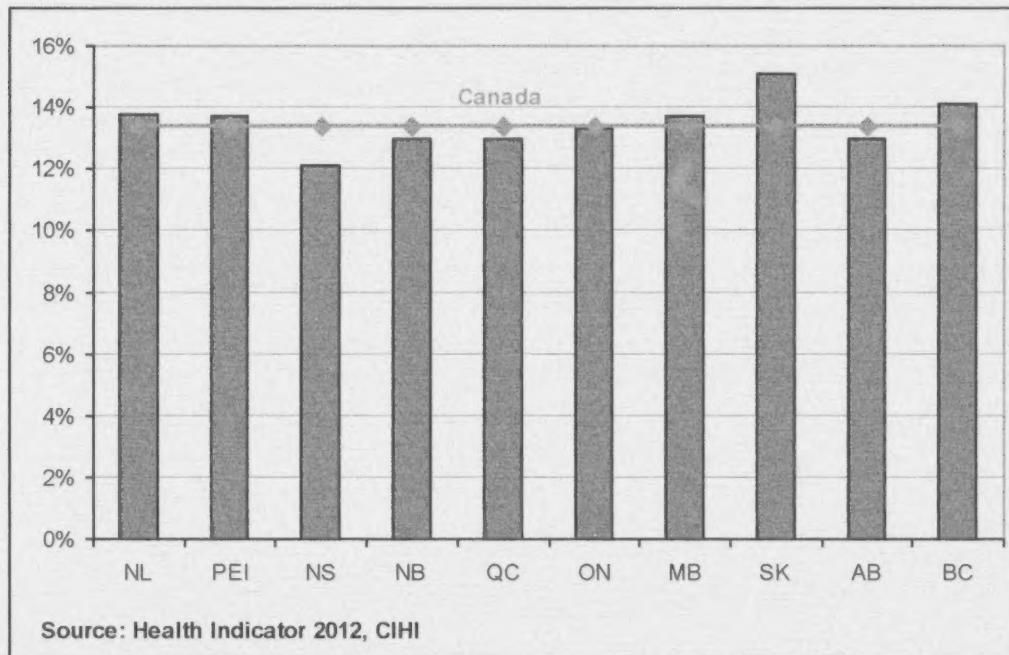


4. 30-Day Medical Readmission Risk-Adjusted Rate is used to measure institutional or community-based quality of care and care coordination. Readmission rates can be influenced by a variety of factors, including the quality of inpatient and outpatient care, effectiveness of the care transition and coordination, and the availability and use of effective community-based disease management programs²⁰. Figure 9 shows Alberta ranked 7th in 2010-11 which was 3 per cent lower than the national average. Although readmission for medical conditions may involve factors outside the direct control of the hospital, high rates of readmission act as a signal to hospitals to look more carefully at their practices, including the risk of discharging patients too early and the relationship with community physicians and community-based care.

¹⁹ Rates are based on three years of pooled data.

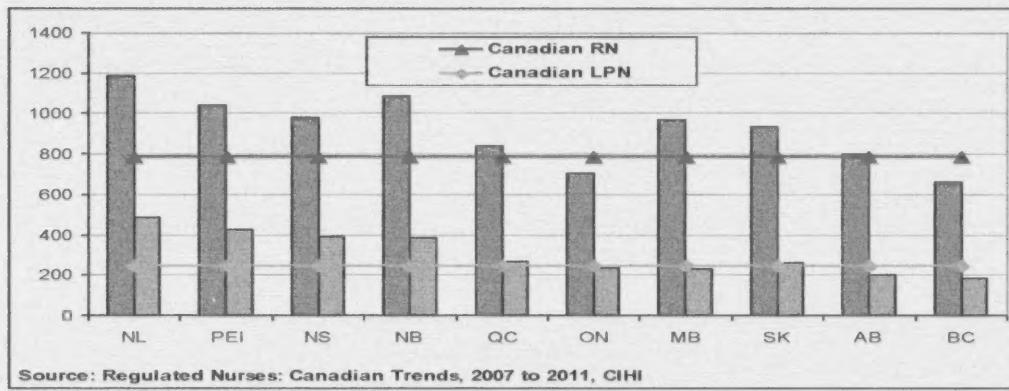
²⁰ Health Indicators 2012, CIHI

Figure 9: 30-Day Medical Readmission Risk-Adjusted Rate by Province, 2010-11



5. Counts²¹ of RNs and LPNs per 100,000 Population are healthcare workforce productivity indicators. The counts of nurses can be influenced by a variety of factors such as: staff mix, paid overtimes, absenteeism, WCB rates etc. As shown in Figure 10, Alberta RNs per 100,000 population were 2 per cent higher than the national average, while LPNs per 100,000 population were 17 per cent lower than the national average in 2011.

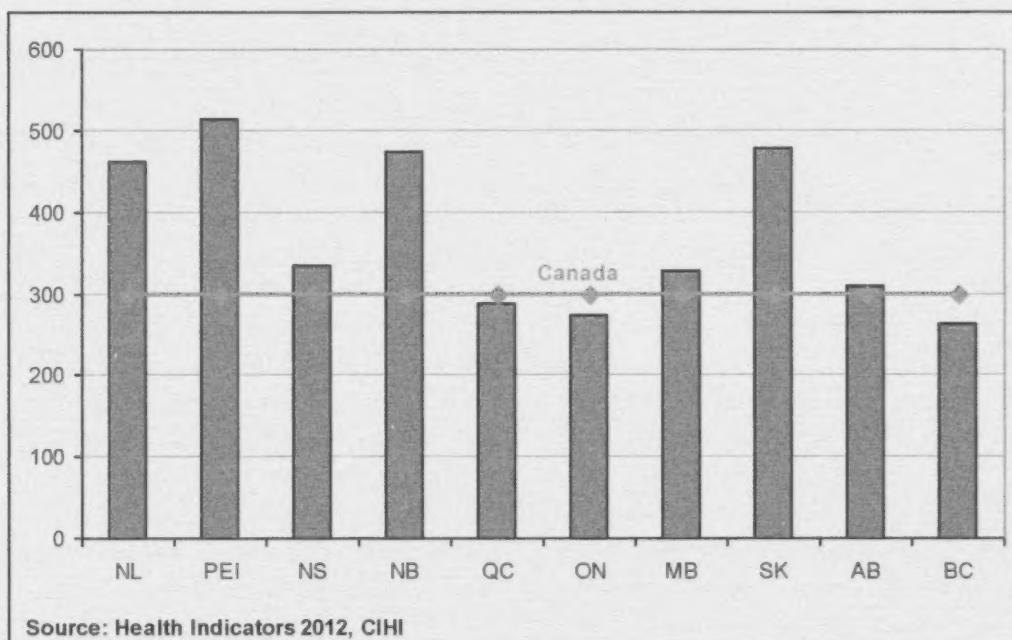
Figure 10: Counts of RNs and LPNs per 100,000 Population by Province, 2011



²¹ Registered Nurse (RN) and Licensed Practical Nurse (LPN) counts include full-time, part-time, casual, and Employed – Status unknown.

6. Ambulatory Care Sensitive Conditions Rate is one of the preventable admission indicators. Age-standardized acute care hospitalization rate for conditions where appropriated ambulatory care prevents or reduces the need for hospitalization, per 100,000 population younger than age 75²². Hospitalizations for ambulatory care sensitive conditions are considered to be an indirect measure of access to appropriate primary health care. While not all admissions for these conditions are avoidable, appropriated ambulatory care could potentially prevent the onset of this type of illness or condition, control an acute episodic illness or manage a chronic disease²³. Figure 11 shows Alberta ranked 7th in 2010-11 which was about 3 per cent higher than the national average.

**Figure 11: Age-Standardized Ambulatory Care Sensitive Conditions Rates
per 100,000 Population, 2010-11**



²² Health Indicators 2012, CIHI.

²³ Discharge Abstract Database, CIHI.

7. Administrative Costs

The percentage of administrative costs to total health expenses is also typically regarded as a measure of health system efficiency since a lower percentage indicates that a greater proportion of the total health expenditure could be spent on costs directly related to providing care. As shown in the Table 3 below, Alberta has the second lowest share of administration to total provincial health spending among provinces as well as the lowest share of administration to total hospital expenses.

Table 3: Administrative Costs

Indicator	Alberta	Canada Average	Highest	Lowest	Alberta's Ranking
Administration as % of Total Provincial Government Health Spending, 2012-13	0.9%	1.2%	PEI (3%)	SK (0.5%)	2 nd Lowest
Administrative Service Expense as % of Total Hospital Expenses, 2009	3.5%	4.8%	ON (5.9%)	AB	Lowest (data n.a. for PEI and SK)

Source: CIHI

8. Long Term Care Capacity

Wait lists for continuing care placement in both community and acute/sub-acute settings can be used as a measure for efficiency in the long term care (LTC) sector. Placing patients in the appropriate environment has a significant impact on utilization of financial resources in the hospital sector. As a general rule, the cost of providing patient care services in hospitals is significantly higher than placing clients in LTC or supportive living environment. Efforts to reduce the number of patients in hospitals who are on wait lists for continuing care placement should improve overall operational efficiency for both the hospital and continuing care sectors and move the province towards better utilization of resources.

Table 4: Long Term Care - Measures for Operational Efficiency

	Time	Actual	2012-13 Target
1) People Waiting in Acute/Sub-Acute Beds for Continuing Care Placement	(As of Sept/2012)	557	350
2) People Waiting in Community for Continuing Care Placement	(As of Sept/2012)	938	850
3) % of People placed in Continuing Care within 30 Days after being assessed	(April-Sept/ 2012)	69%	n/a

Source: AHS Quarterly Report -December/2012

Summary:

Alberta compares favourably relative to other jurisdictions on a number of productivity measures, including 30-day AMI and Medical readmission rates. However, gains in productivity are possible in numerous areas; including the cost of treating the average acute care inpatient (CPWC), total worked hours per weighted cases in nursing inpatient service, Ambulatory Care Sensitive Conditions Rate and long term care occupational efficiency. Measuring variations in health system productivity and learning from them could inform policies and interventions to maximize health outcomes from scarce public resources.

5. COST DRIVERS ANALYSIS

This report analyzes the growth in government health spending using a two-stage approach. First, a decomposition analysis of health cost drivers was conducted where different types of macro factors are considered such as the utilization of services, price, and volume effects (see Appendix for more details discussion on the methodology). Second, specific factors underlying the evolution of these macro factors are examined. Given the significant divergence in the structure of hospital care, physician, and drugs, the three major sectors are analyzed separately for each of the three sectors.

Factors were also grouped into two broad categories: uncontrollable factors and controllable factors. Controllable factors are factors which are more responsive to provincial policy changes and interventions. Uncontrollable factors on the other hand are more structural in nature and are difficult to control and are less responsive to provincial policy changes and interventions.

5.1. Hospital Cost Drivers

To identify the contribution of the main factors underlying the growth in hospital spending, a factor decomposition model was used in the analysis. The time period for this study is from 2005-06 to 2009-10²⁴. The analysis of hospital cost drivers used an analytical framework consisting of:

- **Uncontrollable factors:**
 - Population growth;
 - Aging.
- **Controllable factors:**
 - Wage inflation effects;
 - Non-Wage inflation effects; and
 - Other effects.

The increase in annual hospital expenditures is due to population growth, aging, wage inflation, non-wage inflation and other factors as illustrated in Figure 12. Overall, hospital expenditures increased at an average annual rate of 10 per cent during the 5 years from 2005-06 to 2009-10. Population growth accounted for an average annual increase in hospital expenditure of 2.5 per cent, and aging population accounted for an average annual increase of 0.8 per cent. Meanwhile, wage and non-wage inflation²⁵ accounted for 2.9 per cent and 1.6 per cent of the total growth in hospital spending, respectively. The other effects accounted for an average annual increase of 2.1 per cent. These other effects could include volume and mix of services and the effects of technology and innovation which are controllable. These factors are difficult to estimate explicitly in the hospital sector since there have been a myriad of changes in models of care during the last decade²⁶. Some of these changes have tended to reduce costs (i.e. the shift from inpatient to ambulatory care) while others have tended to increase cost, such as higher average resource requirements for inpatient care.

²⁴ Due to data limitations and availability, the study was only able to analyze this time period.

²⁵ Wage and non-wage inflation were calculated using Canadian Institute for Health Information's (CIHI) data. Parts of this material are based on data and information provided by CIHI. However, the analyses, conclusions, opinions and statements expressed herein are those of the author, and not necessarily those of CIHI.

²⁶ Health Care Cost Drivers: The Facts, CIHI

Figure 12: Cost Driver Shares of Annual Growth Rates in Alberta Hospital Expenditures, 2005-06 to 2009-10

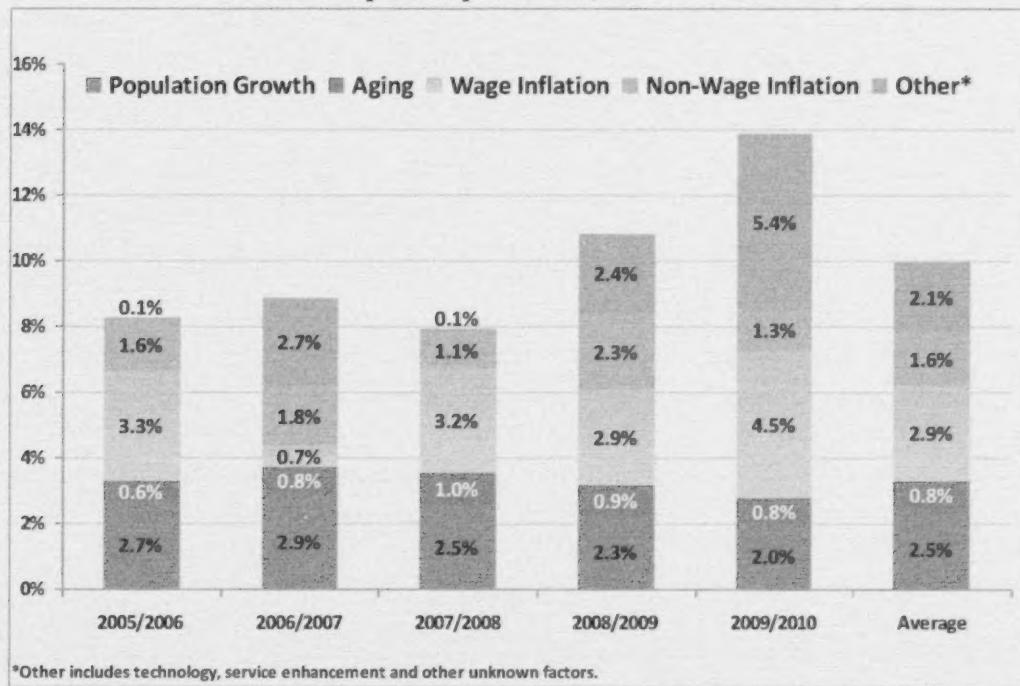
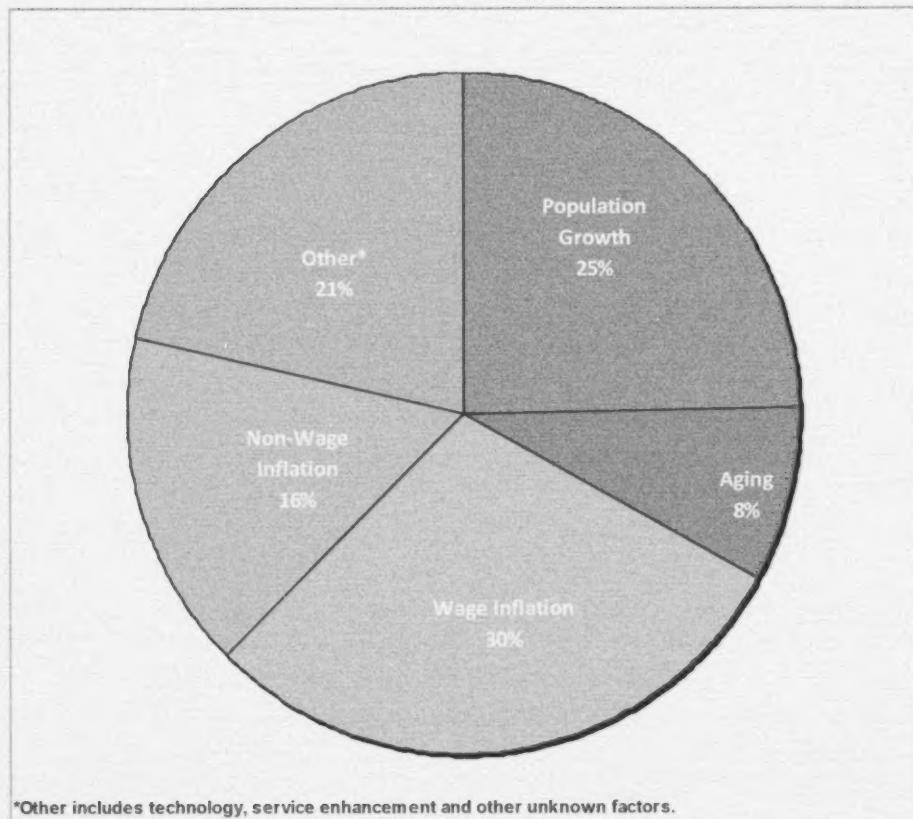


Figure 13 shows the contribution of drivers to the growth in hospital expenditures during the 2005-06 to 2009-10 period. Wage inflation was the largest contributor to hospital expenditure growth at 30 per cent, while total non-wage inflation accounted for 16 per cent of the hospital expenditure increase. Meanwhile, demographic drivers (population growth and aging) accounted for 33 per cent of the increase. The other drivers (e.g., technology and service enhancement) contributed to the remaining 21 per cent of expenditures.

Alberta had the highest rate of population growth and a relatively low rate of growth due to aging. Hospital inflation can be expected to exceed general inflation in the economy due to the fact that compensation is the largest component of hospital expenditure. Technological improvement is another driver responsible for increases in hospital spending. The size of its effect is difficult to quantify.

Figure 13: Contribution of Drivers to Growth in Hospital Expenditures,
2005-06 to 2009-10



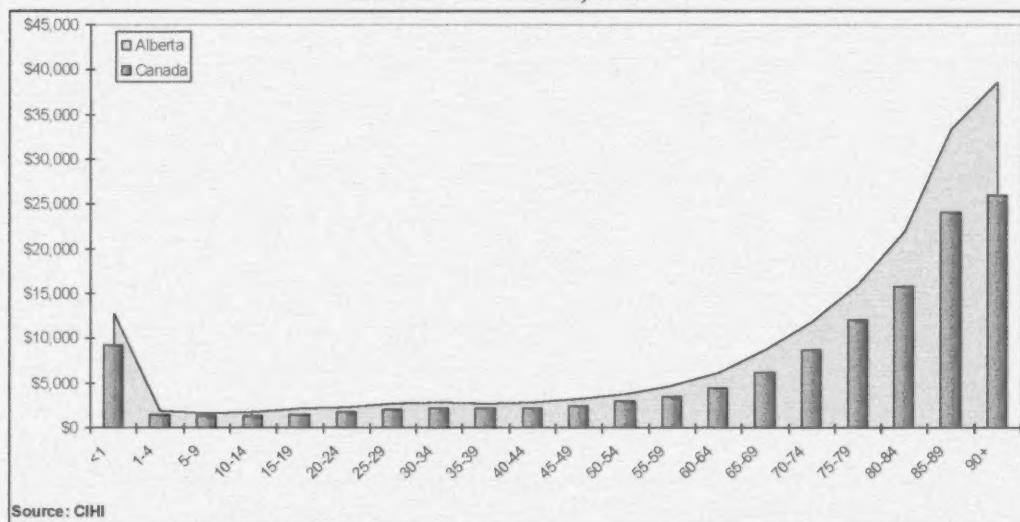
Uncontrollable Factors

Demographics Factors (Population growth and Aging):

The characteristics of the population served by the health system are important hospital cost drivers because as shown in Figure 14, per capita spending on hospitals was highest for infants and the older population. Seniors consume more health care dollars largely as a consequence of two factors: the cost of health care in the last few months of life, and the increased prevalence of chronic illness among older population that tends to require more intensive inpatient care.²⁷

²⁷ A. Palangkaraya and J. Yong, "Population Aging and Its Implications on Aggregate Health Care Demand" International Journal of Health Care Finance & Economics 9, 4(2009): pp. 391-402.

**Figure 14: Provincial Government Hospital Expenditure by Age,
Alberta vs. Canada, 2010**



Alberta's population is growing and aging. The percentage of seniors is projected to increase from approximately 11 per cent in 2011 to 15 per cent in 2021. By 2031, it is projected that there will be more than 923,000 seniors in Alberta, or about one in five Albertans²⁸. Hence, there are concerns that an aging population in Alberta will lead to greater demand for hospital services. In addition, the growing prevalence of chronic illnesses as well as increasing incidence of injury arising from a growing and aging population is also expected to accelerate the growth in hospital spending.

Controllable Factors

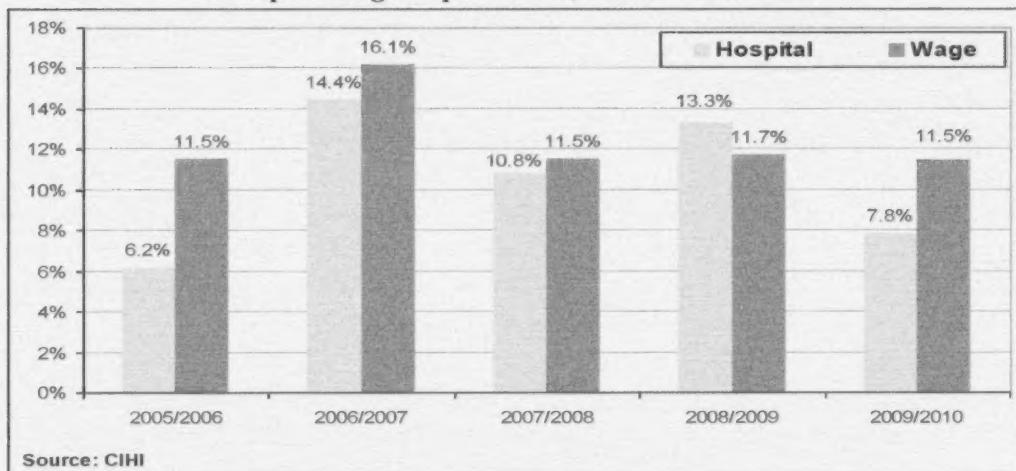
Hospital Inflation (Wage Inflation and Non-Wage Inflation):

Besides general economy-wide inflation, additional specific forces affect inflation in the hospital care sector. Alberta specific hospital inflation in this cost driver analysis is divided into wage and non-wage components. Wage includes salary settlements, increase in benefits, and other wage-related components. Meanwhile, the non-wage component incorporates drugs, supplies, machinery and equipment, infrastructure, and other non-wage related components. Hospital employee wage accounts for more than 60 per cent of total hospital expenditure. Hospital non-wage accounts for the rest of hospital expenditure.

²⁸ Statistics Canada and Alberta Treasury Board and Finance 2011-2050 Demographic Projections

Figure 15 shows that the annual growth rates in spending on hospital wages have been greater than that of total hospital spending in most years. Higher wages in the health sector are due to a number of factors including: higher level of overall wages in Alberta as a result of a relatively stable provincial economy; premium paid to health workforce as they require more specialized training and to attract health professionals; and increases in union wage settlements through non-union wages and contracted services cost.

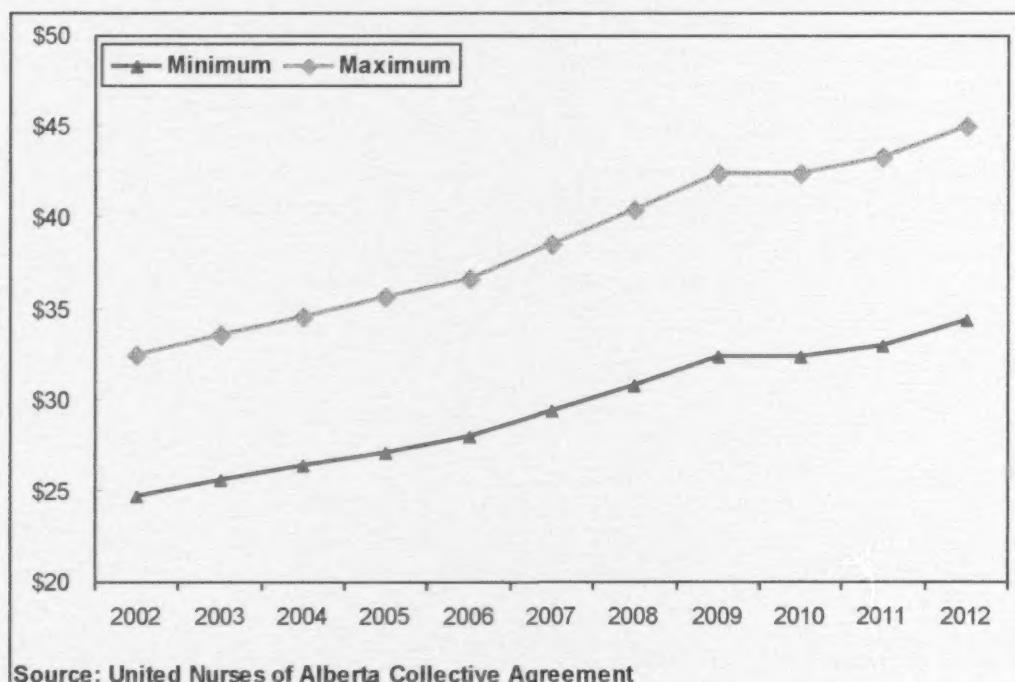
Figure 15: Annual Growth Rates in Alberta Total Hospital Expenditures and Hospital Wage Expenditures, 2005-06 to 2009-10²⁹



Nursing is the single largest component of the workforce in a hospital setting. From 2002 to 2012, the maximum hourly salary for registered nurses grew annually by 3.3 per cent from \$32 to \$45 (see Figure 16).

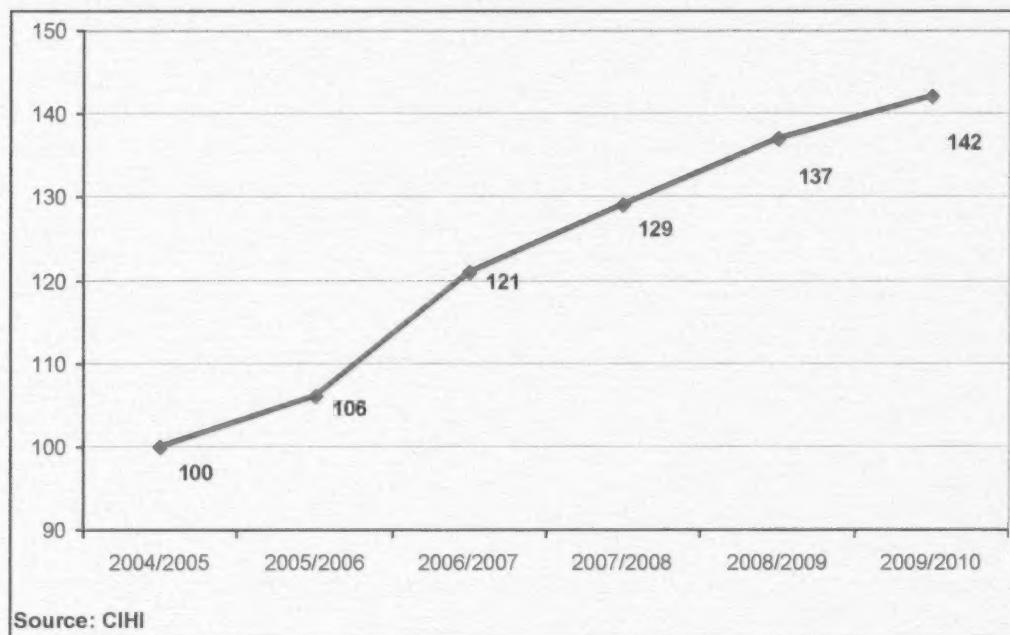
²⁹ Parts of this material are based on data and information provided by CIHI. However, the analyses, conclusions, opinions and statements expressed herein are those of the author, and not necessarily those of CIHI.

**Figure 16: Registered Nurse Minimum and Maximum Hourly Salary in Alberta,
2002 - 2012**



There were also increases in the number of people working in hospitals from 2004 to 2009. The number of hospital earned hours in Alberta hospitals increased by 42 per cent between 2004-05 and 2009-10 (see Figure 17). This could be due, in part, to the expansion of hospital services such as hip and knee replacement and diagnostic imaging. Earned hours include worked hours, benefit hours and purchased hours. In summary, wage has been a significant cost driver for hospitals for two reasons: higher wages per employee and an increase in total hospital earned hours in Alberta.

Figure 17: Index of Growth in Total Hospital Earned Hours in Alberta, 2004-05 – 2009-10³⁰



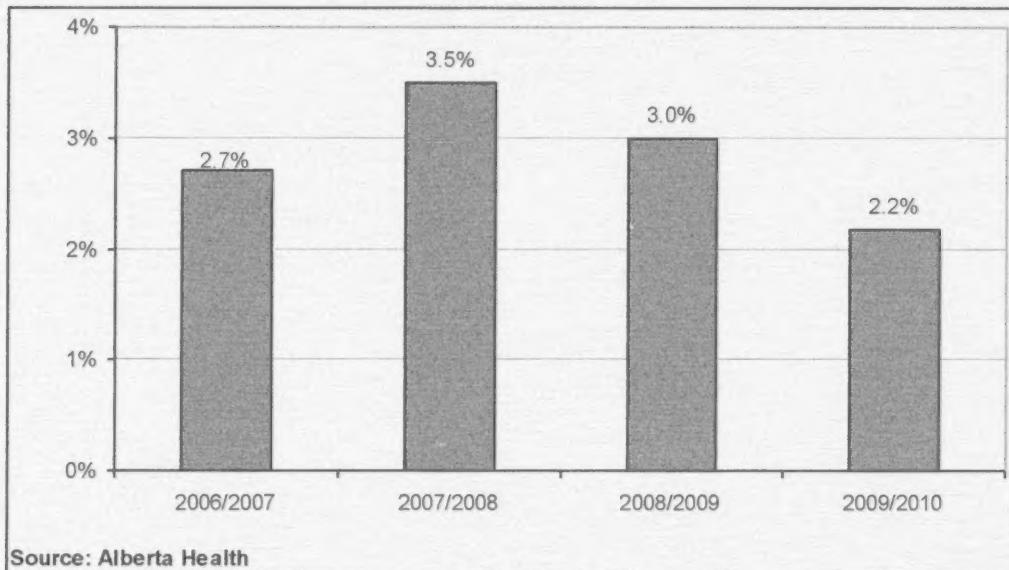
Hospital Utilization:

1. Resource Intensity Weights (RIWs³¹): The past years have seen changes in the utilization of inpatient care in Alberta. Figure 18 shows the annual growth rates in RIWs between 2005-06 and 2009-10. The average RIW grew annually by 2.8 per cent during this period. Each year, the average inpatient required slightly more hospital resource than in the preceding year. The increase in RIW from one year to the next may be the result of sicker patients with more comorbidities or an increase in the number of complex cases and intervention events compared to an earlier period.

³⁰ Parts of this material are based on data and information provided by CIHI. However, the analyses, conclusions, opinions and statements expressed herein are those of the author, and not necessarily those of CIHI.

³¹ RIW is a relative value that describes the expected resource use for any specific case as compared to the average typical non-factor inpatient case in hospital stay. The calculation of RIW for any specific case takes into account its Case Mixed Group (CMG) and also the full effects of such factors as age, comorbidity level and select flagged interventions.

Figure 18: Annual Growth Rates in Resource Intensity Weights (RIWs³²), Alberta, 2006-07 to 2009-10



2. Hospital Services: As shown in Table 5, both inpatient admissions and average length of stay increased annually by 0.8 per cent and 1.2 per cent, respectively from 2001-02 to 2010-11. Patients are staying longer in inpatient care in Alberta. The emergency visits and ambulatory care services visits also increased by 1.0 per cent and 1.5 per cent, respectively. Hospital utilization has not kept pace with population growth (2.2 per cent) during the 10 year period.

Table 5: Hospital Utilizations, Alberta, 2001-02 and 2010-11

	2001-02	2010-11	Average Annual Growth Rate 2001-02 to 2010-11
Inpatient Admissions	292,748	314,032	0.8%
Average Length of Stay (Unadjusted), in days	6.9	7.7	1.2%
Emergency Visits ('000)	1,736	1,896	1.0%
Ambulatory Care Services Visits ('000)	4,071	4,652	1.5%
Source: CIHI			

³² RIW is a measure using the CMG+ 2010 methodology, which provides a common metric for measuring average resource costs each year.

Summary

The significant cost drivers of hospital expenditure are population growth, aging, wage inflation, non-wage inflation, and other effects (technology, services enhancements, and other factors).

5.2. Physician Cost Drivers

To identify the contribution of the main drivers underlying the growth in physician spending, we again used a factor decomposition model. The time period for this study is from 2005-06 to 2010-11³³. This analysis of physician cost drivers uses the following analytical framework consisting of:

- **Uncontrollable factors:**

- Population growth;
- Aging.

- **Controllable factors:**

- Wage inflation effects;
- Non-Wage inflation effects; and
- Other effects.

Annual physician expenditures increased due to population growth, aging, wage inflation, non-wage inflation and other factors as illustrated in Figure 19. Overall, physician expenditures increased at an average annual rate of 11.9 per cent during the five-year period from 2005-06 to 2010-11. Population growth accounted for an average annual increase in hospital expenditure of 2.3 per cent, and aging population accounted for an average annual increase of 0.4 per cent for Alberta. Wage and non-wage inflation accounted for 4.7 per cent and 1.5 per cent, respectively, of the average growth in physician expenditures during this period. Wage inflation is the sum of fee-for service (FFS) payments and Alternate Relationship Plans (ARP). Non-wage inflation is the sum of other physician payments such as Primary Care Initiative, Physician Office System Program (POSP), Physician on Call, and Clinical Stabilization Initiative and other benefits. The other effects accounted for an average

³³ Due to data limitations and availability, the study was only able to analyze this time period.

annual increase of 3.0 per cent over the five years. These other effects can be explained by other factors that are explicitly unaccounted for in the model, which could include technological change.

Figure 19: Cost Driver Shares of Annual Growth Rate in Alberta Physician Expenditures, 2005-06 to 2010-11

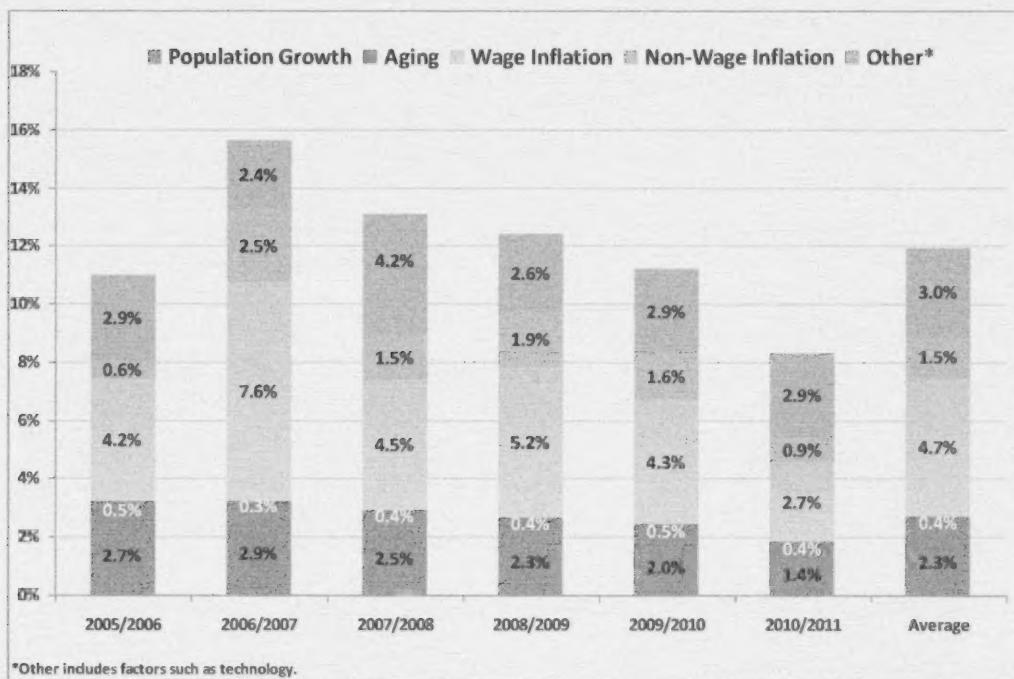
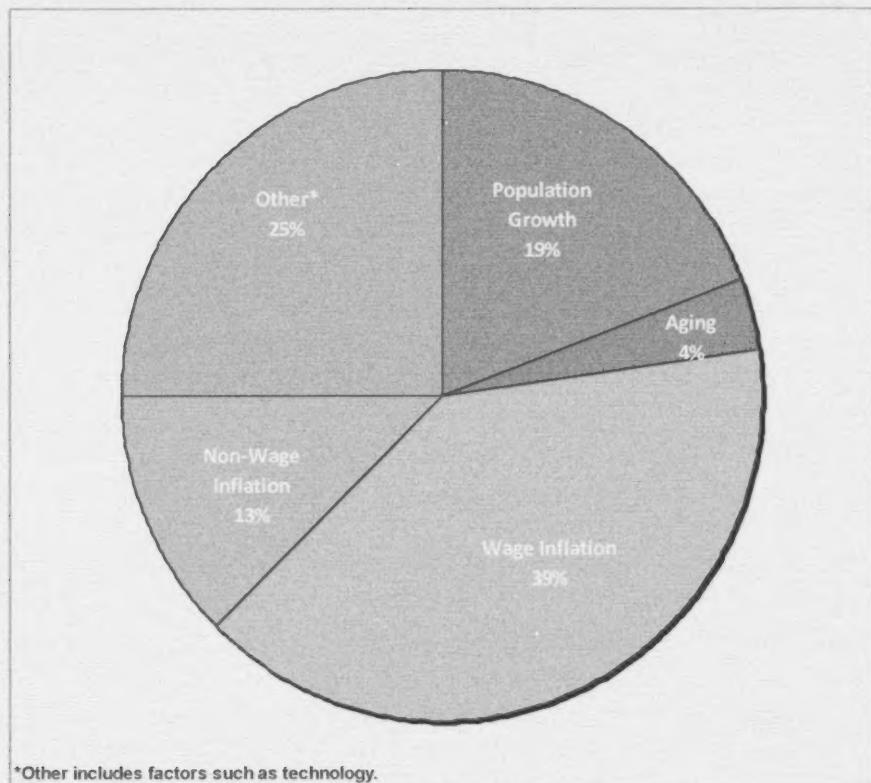


Figure 20 shows the contribution of drivers to growth in physician expenditures during the 2005-06 to 2010-11 period. The largest contributor to physician expenditure growth is wage inflation, which accounted for 39 per cent of the increase. The non-wage component accounted for 13 per cent of the physician expenditure increase. The second biggest contributor is the demographic factors (population growth and aging), which accounted for 23 per cent of the increase. The other factors (e.g., technology and service enhancement) accounted for the remaining 25 per cent of physician expenditures.

**Figure 20: Contribution of Drivers to Growth in Physician Expenditures,
2005-06 to 2010-11**



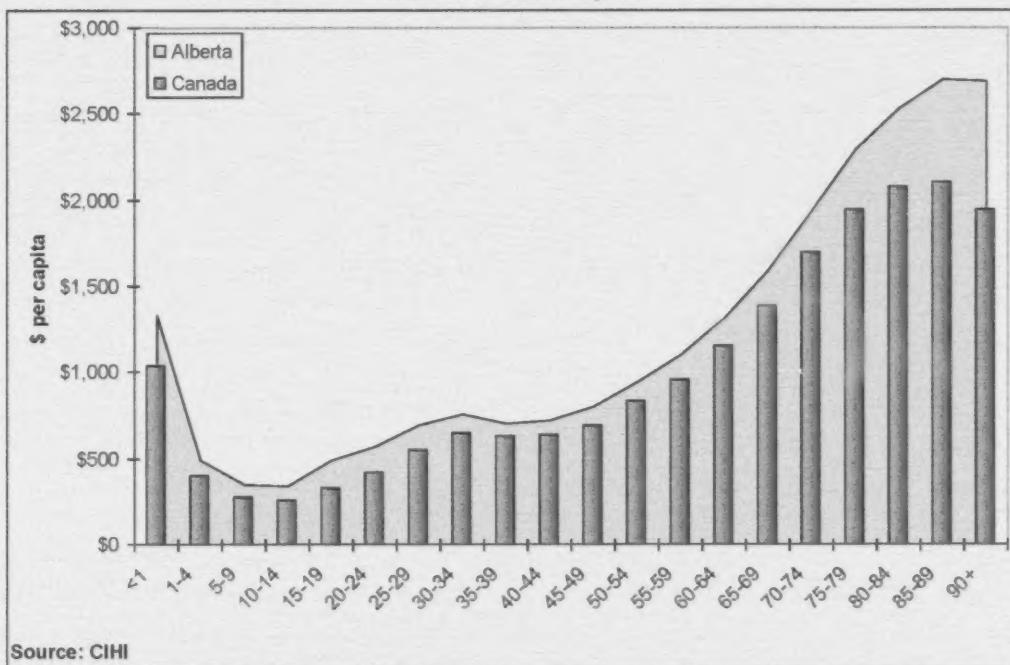
Uncontrollable Factors

Demographics Factors (Population Growth and Aging):

In Alberta, people in the 65 and older age group on average used six times more physician resources than people in other age groups (Figure 21). Thus, the aging of the population will contribute to future increases in physician expenditure.

As shown earlier, there has been significant growth in the proportion of older age groups in Alberta during this time period and this will continue to put pressure on public health care expenditures. Therefore, an aging population is expected to demand more physician services.

**Figure 21: Provincial Government Physician Expenditures by Age and Sex,
Canada vs. Alberta, 2010**



Controllable Factors

Physician Inflation (Wage Inflation and Non-Wage Inflation):

The primary reason for increasing physician spending has been growth in physician wages and salaries. One way of measuring physician wage growth is by looking at the physician fee-schedule agreements. Table 6 shows Trilateral Master Agreement (TMA) average fee increases which reflect cost-of-living adjustments and approximate wage increases. In general, the TMA fee increases have been higher than other wage indicators in the last 5 years.

Table 6: Inflation Analysis: Trilateral Master Agreement (TMA) Average Fee Increase vs. Growth in Selected Wage Indicators

ALBERTA WAGE GROWTH	2005	2006	2007	2008	2009
CPI Inflation Rate	2.10%	3.90%	5.00%	3.10%	-0.10%
Negotiated Wage Settlements, Health Care	3.30%	2.80%	4.70%	4.70%	3.90%
Average Weekly Earnings, Health Care	N/A	4.60%	5.30%	5.70%	7.60%
AVERAGE	--	3.80%	5.00%	4.50%	3.80%
TMA Average Fee Increase*	3.50%	4.50%	4.50%	5.00%	5.00%

Sources: Statistics Canada, Alberta Human Services, and Alberta Medical Association

*Based on October 1 of each year for 2005 and 2006 and April 1 of each year for 2007 onwards.

Even though Fee-for-Service (FFS) remains the most prevalent model of physician compensation in Alberta over the last decade (see Table 6), the importance of Alternate Relationship Plans (ARP) grew significantly during the 2002-03 to 2009-10 period. During this period, ARP expenditures grew by an average annual rate of 34 per cent compared to 8 per cent for FFS. As a result, the share of ARPs to total physician expenditure rose significantly from 2 per cent to 9 per cent during this period.

In terms of the non-wage payments, Alberta has other initiatives for physicians, such as: the Primary Care Initiative, Physician Office System Program (POSP), Physician on Call, Clinical Stabilization Initiative, and other benefits. As shown in Table 7, the share of non-wage payments to total physician payments increased from 7 per cent in 2002/2003 to 15 per cent in 2009/2010. On a per physician basis, non-wage payments increased by almost 17 per cent per year from \$15,205 in 2001-02 to \$60,733 in 2010-11.

Table 7: The Proportion of Physician Payments in Alberta

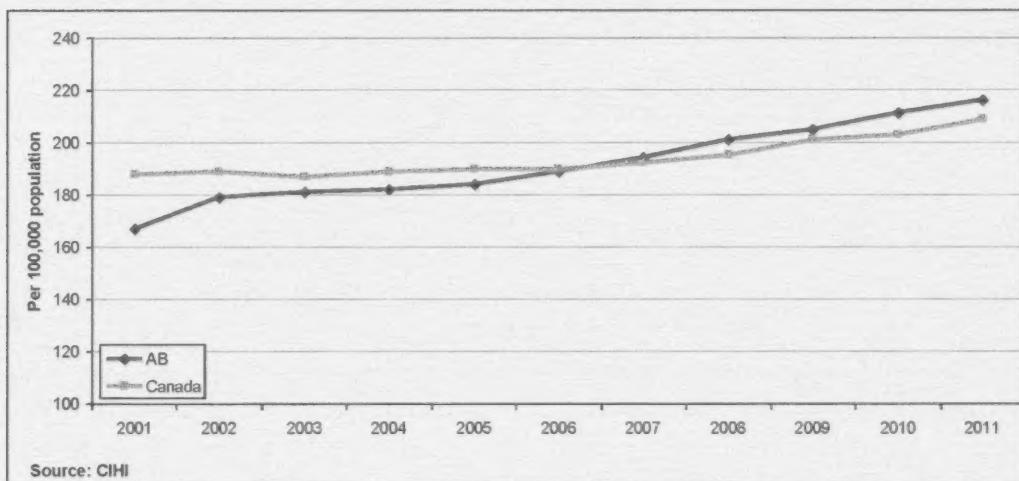
	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10
Fee for Service	91%	86%	88%	86%	81%	79%	76%	76%
Alternate Relationship Plans	2%	4%	5%	6%	6%	8%	9%	9%
Primary Care Initiative	0%	0%	1%	2%	4%	3%	4%	4%
POSP	1%	4%	0%	0%	3%	2%	0%	1%
Physician On Call	4%	4%	5%	4%	4%	4%	3%	3%
Clinical Stabilization Initiative	0%	0%	0%	0%	1%	2%	4%	4%
Benefits	2%	2%	2%	2%	1%	3%	4%	3%

Source: Alberta Health

Physician Supply:

In Alberta, the number of physicians per 100,000 population increased by an average annual rate of about 2.6 per cent from 167 to 216 over the 2001-2011 period (See Figure 22). This growth was almost two times higher than Canadian average of 1.1 per cent.

Figure 22: Total Physicians per 100,000, Alberta vs. Canada, 2001 - 2011



The increase in physician supply has been partly driven by the rising number of new physician graduates coming into Alberta. For example, the number of newly registered physicians graduating from Alberta universities increased on average annual increase of about 9 per cent. The number of newly registered physicians graduating from other Canadian universities and outside Canada also rose slightly during this period.

While the impact of physician supply on physician spending growth is implicitly incorporated into the cost drivers model (via the wage and non-wage inflation components)³⁴, a separate analysis is required to be able to isolate its impact from other interrelated factors (such as utilization). For example, one study³⁵ estimated that physician supply accounted for 23.5 per cent of the total increase in Alberta's real per capita provincial

³⁴ This is because the calculation of physician wage inflation involves using expenditure shares by specialty. Changes to the volume and mix of physician supply also drive changes to the expenditure shares by specialty over time. Moreover, the non-wage inflation is calculated as the average cost per physician for non-wage physician spending.

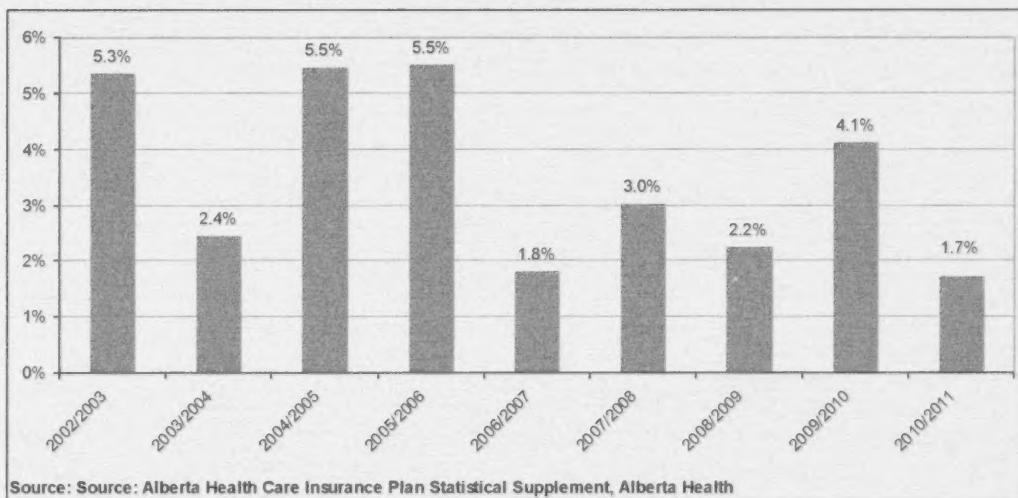
³⁵ Source: *Physician Numbers as a Driver of Provincial Government Health Spending in Canada (Unpublished Conference Manuscript Paper)*. Livio Di Matteo Department of Economics, Lakehead University.

government physician expenditures between 1975 and 2009 (which means that factors other than physician supply accounted for the remaining 76.5 per cent of the total increase).

Physician Utilization:

The number of physician services provided has increased annually by 3.5 per cent between 2002-03 and 2010-11, from 27.8 million to 38.0 million services (See Figure 23). In terms of study period (2005-06 to 2010-11), the annual growth rate has been 3.1 per cent. In comparison with population and aging effect, the growth in the number of services provided by physicians has been slightly higher than these two effects. On the other hand, since 2005-06, the number of physician services provided per 1,000 population only increased by 0.7 per cent.

**Figure 23: Annual Growth Rates in Physician Services Provided, Alberta,
2002-03 to 2010-11**



Summary:

Results from the cost driver analysis show the main drivers of physician spending growth during the 2005-06 to 2010-11 period were wage inflation followed by demographic drivers (population growth and aging). Other factors (e.g. service utilization, technology and service enhancement) also accounted for a significant portion of the growth in physician spending.

5.3. Drug Cost Drivers

To identify the contribution of the main factors underlying the growth in drug spending, we again used a decomposition model. The time period for this study is from 2004-05 to 2010-11³⁶. The analysis of drug cost drivers uses an analytical framework consisting of:

- **Uncontrollable factors:**

- Population growth;
- Aging.

- **Controllable factors:**

- Drug Price Inflation;
- Drug Mix Impact; and
- Other effects.

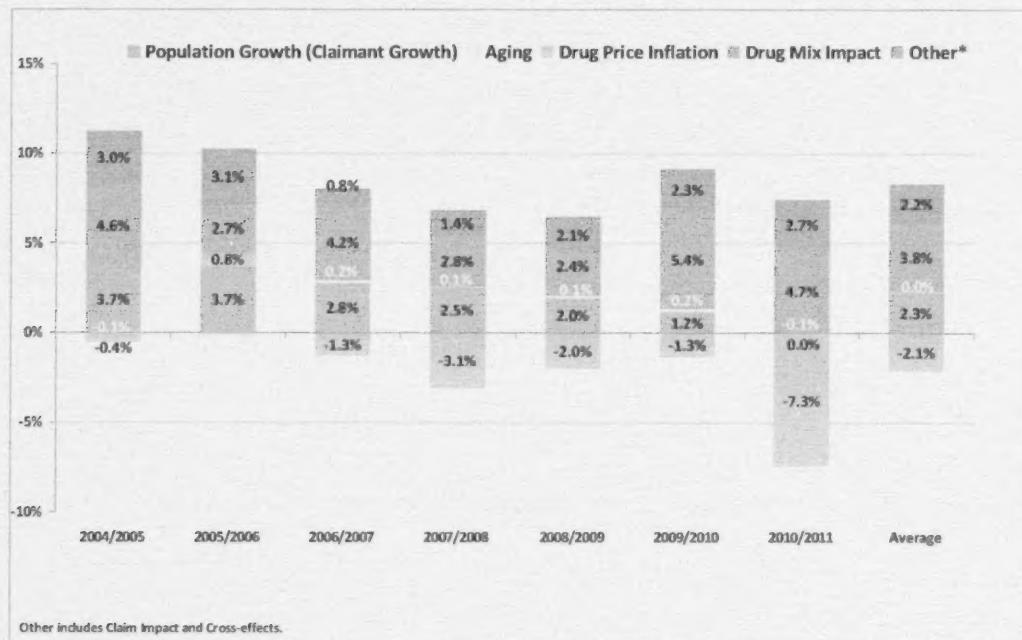
Annual drug expenditures have increased as a result of population growth, aging, drug price inflation, drug mix impact and other factors are illustrated in Figure 24. Overall, drug expenditures increased at an average annual rate of 6.2 per cent during the 2004-05 to 2010-11 period. Population growth (Claimant Growth³⁷) accounted for an average annual increase in drug expenditure of 2.3 per cent. Drug Price inflation and Drug Mix Impact³⁸ contributed -2.1 per cent and 3.8 per cent, respectively, of the average growth in drug expenditures during the 2004-05 to 2010-11 period. The negative effect of drug price inflation is due to the substitution of lower cost multiple-source drugs for higher cost single-source drugs as well as reimbursement policy changes for multi-source drugs, which have resulted in significant saving in total drug costs. Drug mix impact – which represents factors that affect the average cost of treating a given condition due to changes in the type of drugs selected for such treatment – was also a significant driver of total drug spending growth. The other effects such as claim impact (which represents the change in total drug cost due to changes in the volume of claims per claimant), as well as the drug quantity per claim accounted for an average annual increase of 2.2 per cent over the past six years.

³⁶ Existing model for drug cost drivers was only available for this time period.

³⁷ Number of people who have made pharmaceutical claims.

³⁸ Entering and exiting of drug ingredients such as changes in drug utilizations across drug products and different groups of drugs.

Figure 24: Cost Driver Shares of Annual Growth Rate in Alberta Drug Expenditures, 2004-05 to 2009-10



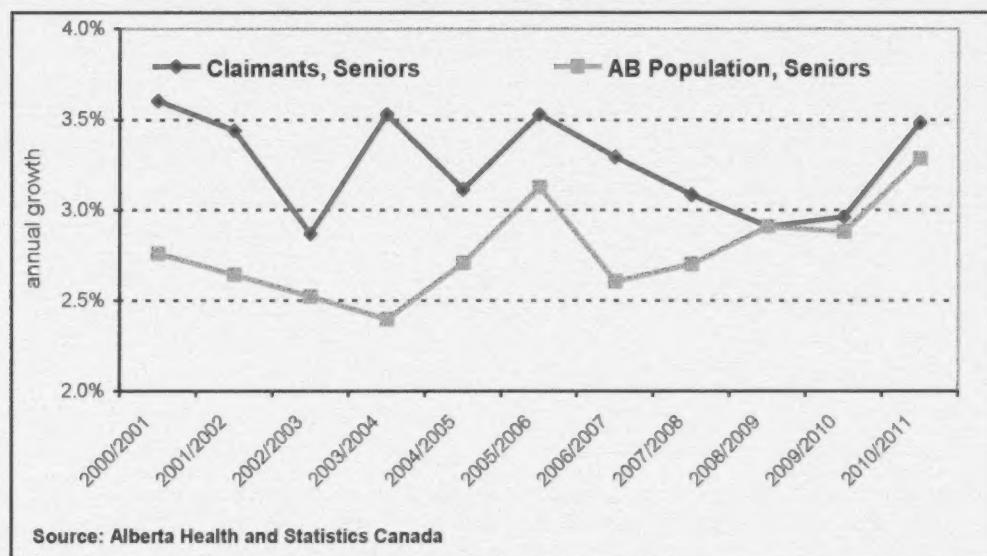
Uncontrollable Factors

Demographics Factors (Population Growth and Aging):

Population growth is an important factor because seniors account for the majority of drug expenditures and there has been a high growth in Alberta's senior population in recent years. Figure 25 below shows the annual growth rate in Alberta's senior population over the last decade compared to the growth rate in the number of seniors taking medications (i.e. claimants) under the Alberta Health drug coverage.³⁹

³⁹ Since the drug cost drivers model incorporates the number of seniors taking medications (i.e. claimants), we actually have a direct utilization effect on drug expenditures and for this reason we do not have an utilization section unlike the ones reported for the hospital and physician models.

Figure 25: Annual Growth in the Number of Claimants Aged 65 and over and Alberta's Overall Senior Population, 2000-01 to 2010-11⁴⁰



The aging effect in this study represents the change in total drug cost due to changes in age mix of population. The age mix has not changed substantially over time; therefore, drug costs continue to be dominated by seniors.

Controllable Factors

Drug Price Inflation:

Two groups of drug products must be considered when examining drug prices: patented products and non-patented products (i.e. generic products and brand name products whose patents have expired). According to Patented Medicine Prices Review Board (PMPRB)⁴¹, patented products accounted for about 62 per cent of spending in Canada, which was a decrease in their share of total spending. The majority of drug spending in Canada is for products that are subject to price controls and directly tied to CPI.

⁴⁰ The annual growth rates between Statistics Canada and AHCIP population estimates have been quite similar until the elimination of health care premiums beginning in 2009. This led to annual population growth rate being higher when the AHCIP population registry data is used.

⁴¹ Canadian prices of patented products are regulated by the Patented Medicine Prices Review Board (PMPRB).

Regulatory policy measures at the provincial level also limit price increases for non-patented drugs. These measures include formulary management, incentivized use of generics, reference-based pricing, price freezes, and limits on markups. Most provinces limit reimbursement of generic drugs as a percentage of the equivalent brand name product⁴². Unlike new patented drugs that are chemically or biologically distinct from their competitors, generic drugs in most cases are considered equivalent to their competitors. Generics therefore generally compete by being cheaper than their brand name counterparts. According to CIHI, generic prices decreased as a percentage of brand name prices, from 65.1 per cent in 2004–05 to 59.9 per cent in 2009–10.

In Alberta, the costs for generic drugs have been reduced significantly in recent years. In 2010, the province started to implement significant changes to generic drug pricing policies that have contributed to offsetting the significant growth in provincial drug expenditures.

Effective April 1, 2010 the price of existing generic drugs was reduced to 56 per cent of the price of the comparable brand drugs. The price of new generic drugs was reduced to 45 per cent of the price of the comparable brand drugs. Further changes to generic drug pricing became effective July 1, 2012, when the Alberta government reduced the price it pays for all generic drugs to 35 per cent of the comparable brand drug price. The July 2012 price reduction has been projected to save the Alberta government approximately \$85 million in 2012-13⁴³.

On January 18, 2013, Premiers announced that participating provinces and territories agreed to establish a price point for six of the most common generic drugs at 18 per cent of the comparable brand drugs effective April 1, 2013. This reduction has been projected to save Alberta approximately \$32 million in 2013-14⁴⁴.

⁴² Source: Drivers of Prescription Drug Spending in Canada, CIHI.

⁴³ Source: Alberta Pharmacists' Association. http://www.rxa.ca/n_AboutRxA/NewsReleases.aspx?id=16150

⁴⁴ Alberta Health estimates

Drug Mix:

Aside from changes at the therapeutic class level, shifts in the type of drugs within a therapeutic class (i.e. drug classes) also drive expenditure. The mix of drug classes used within a therapeutic class could result from either patients switching drugs—either within a drug class or between drug classes within a therapeutic category—or from new users using a relatively high proportion of a particular drug or drug class. These changes could lead to a higher proportion of more expensive drugs being used within the class, thereby increasing drug expenditures.

While drug classes for hypertension and high cholesterol still dominate drug expenditures in Alberta, these drug classes did not experience the fastest growth in spending over the last decade. In fact, spending on drugs that are used to treat less common conditions (such as cancer and autoimmune diseases) saw more significant growth during this period. This trend was partly due to the uptake of new biologic drugs, which are often more expensive than existing drugs⁴⁵.

Other Factors:

There are other factors that also influence drug expenditure. Health-system related factors such as changes in provincial drug subsidy programs concerning regulation/policy around drug plan eligibility and co-insurance, the extent of formulary listings and the availability of, and access to, third-party insurance coverage impacted drug access and utilization. In general, the more accessible and more generous insurance coverage is, the less price sensitive consumers are, and the more likely people are to go to consume drugs. Other factors include the supply of prescribers, dosing changes and drugs exiting the market.

Changes in clinical practice guidelines can also influence the types of drugs being used by recommending drugs as first- or second-line therapies. They may also influence the volume of use by recommending that more or fewer people be treated with certain drugs. New indications⁴⁶ can also result in switching between classes of drugs used to treat similar

⁴⁵ Source: Drivers of Prescription Drug Spending in Canada, CIHI

⁴⁶ New indications refer to new applications of an existing prevention, diagnosis or treatment of a disease.

conditions or switching between drugs within a class. Provided there is a difference in price, any switching will affect drug expenditure.

Summary:

Results from the cost drivers analysis show that drug mix impact was the main driver of drug spending growth during the 2004-05 to 2010-11 period, followed by demographic and claim impacts. Trend analysis of the demographic composition and health status of the population shows that the Alberta population has become older over the last decade. Further population aging and increasing disease prevalence are expected to fuel these cost drivers in the future. On the other hand, declines in drug prices (due to the substitution of lower cost generic drugs for brand drugs) had partially offset the increase in the above cost drivers historically.

6. PROJECTIONS

Methodology:

Spending projections for the next 10-years of provincial health care (2012-13 to 2021-22) in Alberta are based on three different approaches: (1) Extrapolation method; (2) Cost Drivers Model (Factor Decomposition); and the (3) AHS 2030 Planning Model. By using more than one approach, we are able to show the range of possible paths for future health care spending growth, as well as validating the projections. These projections are then compared to health care spending projections at the national level. Each projection has different underlying assumptions that drive variations in the projections across the three approaches.

The extrapolation method assumes that recent trends in health care spending growth by sector will continue in the future. Projections using this approach are based on 5-year historical growth rates⁴⁷ for each sector (namely, physician, hospital, drug and others) using the latest data from CIHI.

⁴⁷ Source: CIHI's National Health Expenditure Trends 1975-2012. The 5-year historical average growth rate is based on 2008-09 to 2012-13 (latest) data from CIHI. As such, projections under the extrapolation approach may be lower than those under the two other approaches for some sectors given than health care spending growth has slowed down, particularly in the last few years.

Meanwhile, projections using the cost drivers model assume that several factors (such as price inflation) will grow according to their recent historical trends. These projections make further assumptions about the future course of individual cost drivers for each of the three major sectors (please see Appendix for more details on these assumptions).

Similar to the cost drivers model, the AHS planning model also generates projections by making assumptions about the future course of each of the components of the model, specifically on the future numbers of individuals by health state, utilization rates and variations in future unit costs. Projections using this approach assume that treated prevalence rates and utilization will remain constant over time. In addition, population growth and aging are assumed to grow at a combined 2.5 per cent annually while unit costs are assumed to increase by 7.2 per cent every year across all sectors.

10-year projections for provincial government health care spending at the national level were obtained from the Office of the Parliamentary Budget Officer (PBO)⁴⁸. This is the only source we found that provides projections on provincial government health spending at the national level. These projections are based on PBO's baseline long-term fiscal projections. PBO projects provincial health spending at the national level to grow by an average of 6.1 per cent in 2007-2016 and 5.1 per cent in 2017-2024. These projections, however, are only at the aggregate level and are not available by sector. As such, this report was unable to make comparisons between Alberta and Canada projections at the health sector level.

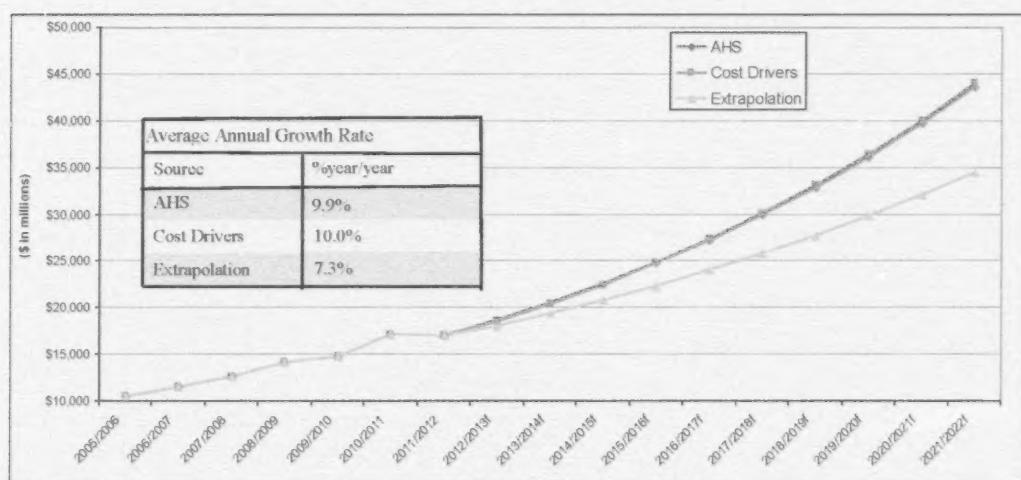
Projection – Total Provincial Government Health Spending:

As with any long-term projection of future health care spending, our projections are subject to uncertainty. As such, the projections in this report should be regarded as an evidence-based indication of future provincial health spending under current policies and from today's perspective. Actual spending in the future could differ significantly from the projections in this report. For example, spending could change as a result of unanticipated developments in demographic, economic, or health care spending growth trends or changes in policies or interventions of care which could affect the trajectory of health care spending.

⁴⁸ Source: *Renewing the Canada Health Transfer: Implications for Federal and Provincial-Territorial Fiscal Sustainability*, Office of the Parliamentary Budget Officer, Ottawa, Canada, January 19, 2012.

Projections using these three approaches indicate that total provincial government health spending will more than double in the next ten years, reaching anywhere between \$34 billion and \$44 billion by 2021-22 (see Figure 26). This represents an average annual increase of somewhere between 7 per cent and 10 per cent during the period 2012-13 to 2021-22, which is much higher than PBO's projection of about 5.6 per cent for Canada. Projections using the AHS and cost drivers models are similar, while the projection under the extrapolation method is much lower⁴⁹. Nonetheless, these three different approaches suggest that provincial government health spending will increase at a much faster rate than the Alberta economy in the next ten years⁵⁰.

**Figure 26: Total Provincial Government Spending Actual and Forecast
2005-06 to 2021-22f**

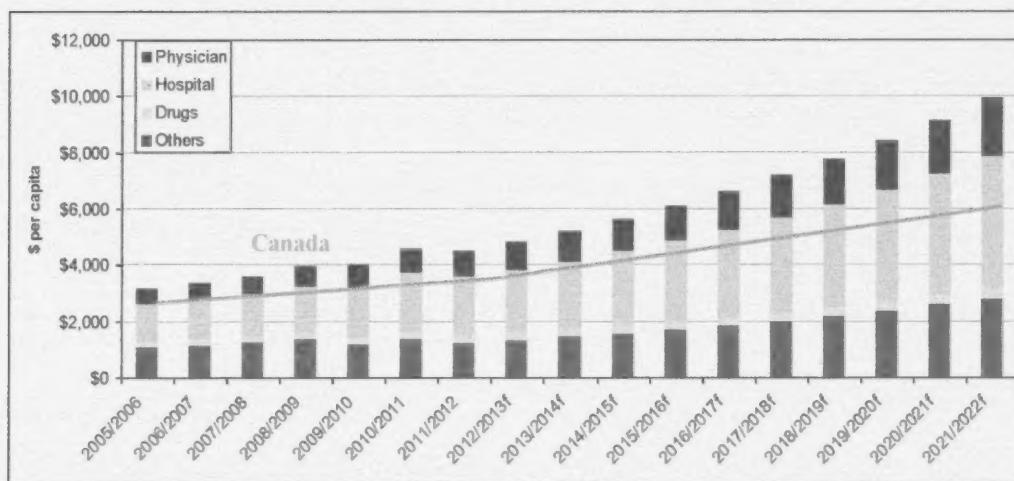


⁴⁹ Under the extrapolation method, average annual spending growth in the 'other' sector (which comprise roughly 30% of Alberta's total provincial health spending) is projected at 2.1% over the forecast period which is significantly lower than those under the two approaches (9.9% in AHS and 10.3% in cost drivers model). This is because spending in the other sector has seen declines in some years since 2009/2010 which pulled down its historical average growth rate.

⁵⁰ Latest long-term economic outlook by Conference Board of Canada is forecasting the Alberta economy to grow by about 6% during this period (based on nominal GDP growth).

On a per capita basis⁵¹, provincial government health spending under the cost drivers model is projected to reach \$9,912 by 2021-22 (see Figure 27) compared to \$5,943 at the national level. This increase in health spending represents an average annual increase of 8.2 per cent for Alberta during the period 2012-13 to 2021-22 compared to only 4.5 per cent at the national level. Therefore, the gap in per capita spending between Alberta and Canada will continue to widen significantly over the forecast horizon, which is consistent with what has been observed over the last decade.

**Figure 27: Per Capita Provincial Health Spending, Alberta (bar)
and Canada (red line), 2005-06 to 2021-22(f)**

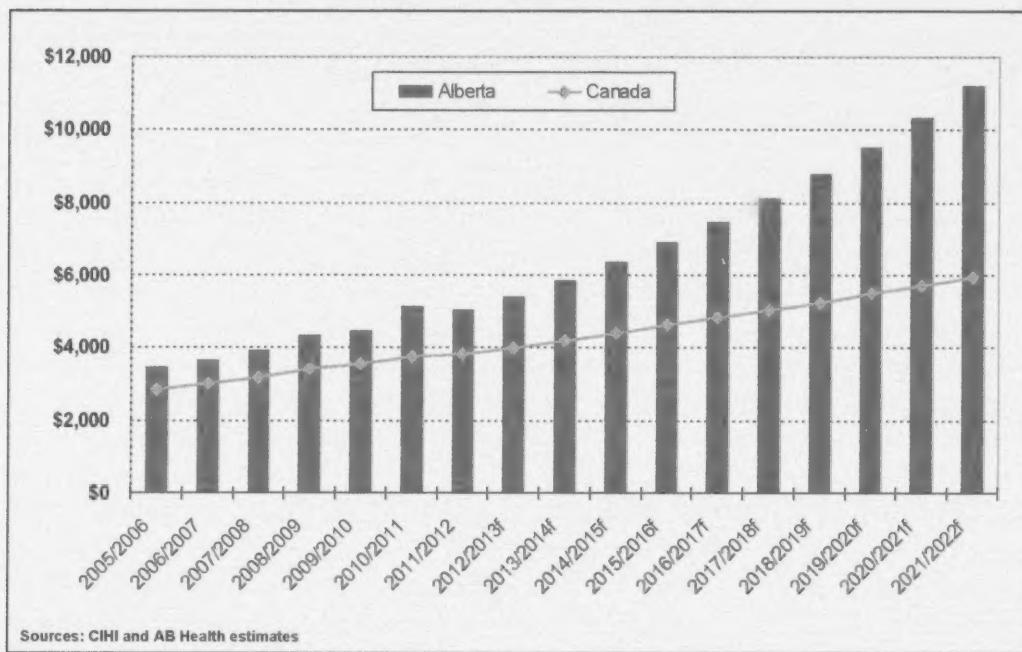


Meanwhile, when standardized to the Canadian population, Alberta's projected per capita provincial health spending⁵² under the cost drivers model remains higher than the national average, reaching \$11,186 by 2021-22 (see Figure 28). Despite our relatively younger population, Alberta's per capita spending is expected to remain persistently higher than the national level under a status quo scenario for Alberta.

⁵¹ Per capita spending figures for Alberta were calculated using latest population projections from Alberta Treasury Board and Finance. Meanwhile Canadian per capita figures were computed using Statistics Canada's latest population projections.

⁵² This report is unable to provide a breakdown of Alberta's age-gender adjusted per capita spending by sector as the data required to the adjustment for Alberta's drug spending were not readily available at the time this report was prepared. As such, the adjustment was made at the aggregate per capita spending level using latest year expenditure weights from CIHI. Note that CIHI also does not provide a breakdown of their age-gender adjusted per capita spending estimates by sector.

**Figure 28: Age-Gender Adjusted Per Capita Provincial Health Spending,
Alberta and Canada, 2005-06 to 2021-22(f)**

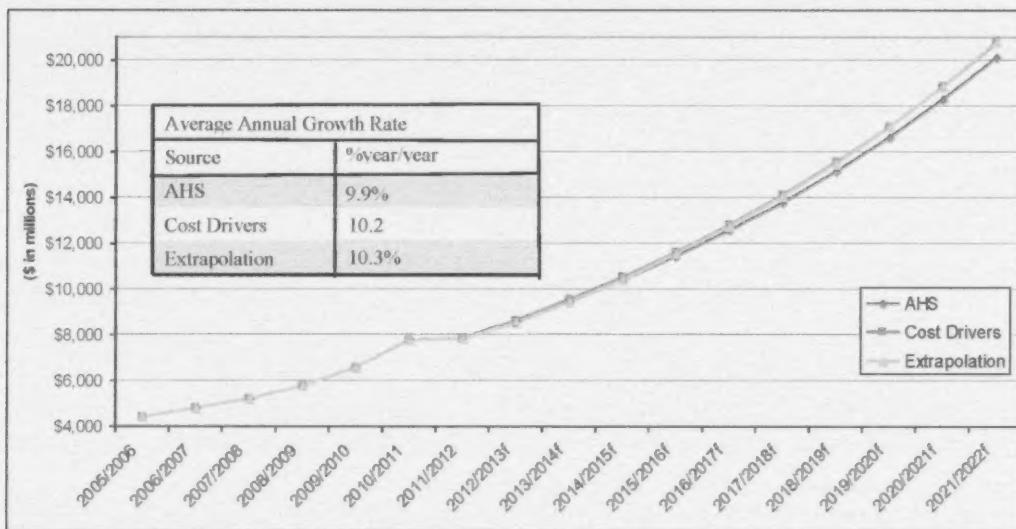


The following sections will present the projections for health care spending for the physician, hospital, and drug sectors.

Projection – Hospital Spending:

The AHS Model projects hospital spending to increase annually by 9.9 per cent, while the extrapolation model projects an annual increase of 10.3 per cent, reaching between \$20 billion and \$21 billion by 2021-22. Projections using the three approaches are quite similar, as shown in Figure 29.

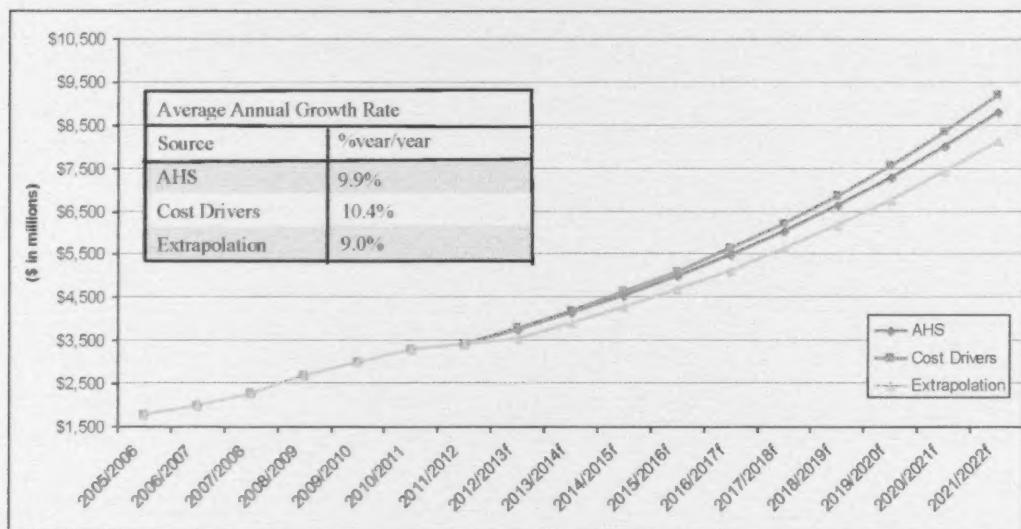
**Figure 29: Total Hospital Spending Actual and Forecast
2005-06 to 2021-22f**



Projection – Physician Spending:

The cost drivers model projects average annual growth in physician spending at 10.4 per cent, while the extrapolation method projects 9.0 per cent during the forecast period. This means that physician spending is projected to reach between \$8.1 billion and \$9.2 billion by 2021-22. Projections using the three different approaches are somewhat similar to each other (see Figure 30).

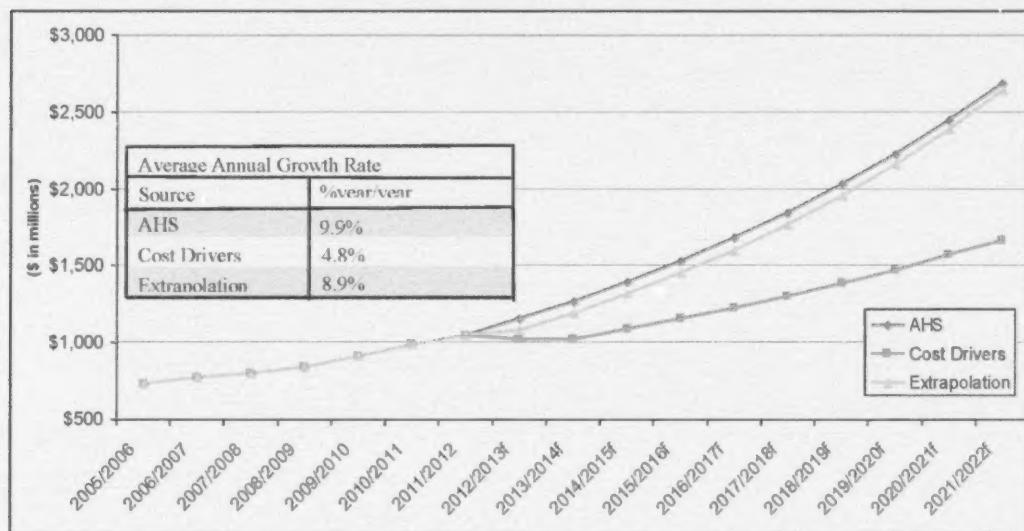
**Figure 30: Total Physician Spending Actual and Forecast
2005-06 to 2021-22f**



Projection – Drug Spending

The cost drivers model projects an average annual increase in drug spending of 4.8 per cent while the AHS model projects 9.9 per cent over the forecast horizon, or somewhere between \$1.7 billion and \$2.7 billion by 2021-22 (see Figure 31). Unlike the projections from the two other approaches, the cost drivers model projection captures the impact of recent changes to generic pricing policies. These changes include further reduction in the price of generic drugs to 35 per cent of the price of comparable brand drugs (effective July 1, 2012) as well as lowering the prices of six of the most common generic drugs to 18 per cent of the comparable brand drugs (effective April 1, 2013). Under the assumption that there are no further policy changes over the forecast horizon, savings are projected in 2012-13 followed by drug spending gradually converging back to its growth path, albeit at a much lower level.

Figure 31: Total Drug Spending Actual and Forecast
2005-06 to 2021-22f



7. CONCLUSION

This report examined historical trends, fiscal sustainability, and the cost drivers of health expenditures. Broadly speaking, we find that the cost drivers of health expenditure are wages and compensation, drug-related factors, population growth, aging population and other factors (technology, non-wage inflation and others). These cost drivers will continue to put pressure on the fiscal sustainability of the province's public health care system.

Wage inflation has been a significant cost driver for both hospital and physician spending. Wage inflation accounts for 30 per cent in hospital spending and 39 per cent in physician spending. Population growth also had a significant effect on all health sectors due to Alberta's higher rate of population growth in last decade. On the other hand, population aging had a modest impact because of Alberta's younger population. However, a rapidly rising senior population is expected to exert additional pressures on health care spending going forward. In addition, the continuing shift to more expensive drugs (drug mix impact) and non-wage inflation for hospitals and physician sectors were also found as significant cost drivers.

This report also looked into cross-provincial variations in health system productivity and efficiency. This report finds that while Alberta compares favourably with other jurisdictions on a number of productivity measures, there remain areas for potential improvement.

This study also presented 10-year projections of total provincial government health expenditure, including hospital, physician and drug sectors out to 2021-22. While long-term projections are inherently subject to uncertainty, these could be regarded as a reasonable indication of the future path in provincial health care spending under current policies and from today's perspective. The results suggest that provincial health spending will more than double in the next ten years, reaching anywhere between \$34 and \$44 billion by 2021-22. This represents an average increase of anywhere between 7 per cent and 10 per cent per year during the forecast period. Our projections also suggest that provincial government health spending will continue to increase at a rate faster than the projected growth in the Alberta economy during this period.

APPENDIX

Technical Notes

A. Factor Decomposition Methodology

This section briefly describes the methodology behind the cost drivers analysis in this report. The impacts of volume and inflation pressures on growth in provincial health expenditures were quantified using factor decomposition. Factor decomposition is a methodology for decomposing observed outcomes, such as health expenditures, into parts attributable to each of the multiple factors.

Figure A.1 presents a high-level overview of the factor decomposition methodology. As illustrated in the chart, a multi-step process was used to calculate pressures attributable to each volume and inflation factor. First, expenditure growth is split into the effects of inflation and a residual. In subsequent steps, the effects of population growth and aging are separated from the residual, resulting in successively lower magnitudes of the residual. As a final step, the residual is renamed as the contribution of all other factors for which their individual effects are difficult to separate at the macro level because of measurement and definitional issues. These include technology, service enhancement, productivity and other factors. Note that there are multiple steps involved in each step.

Population growth and aging were calculated using Statistics Canada's population estimates⁵³. Aging is captured through the model by the changes in the relative population shares and is calculated for each sector.

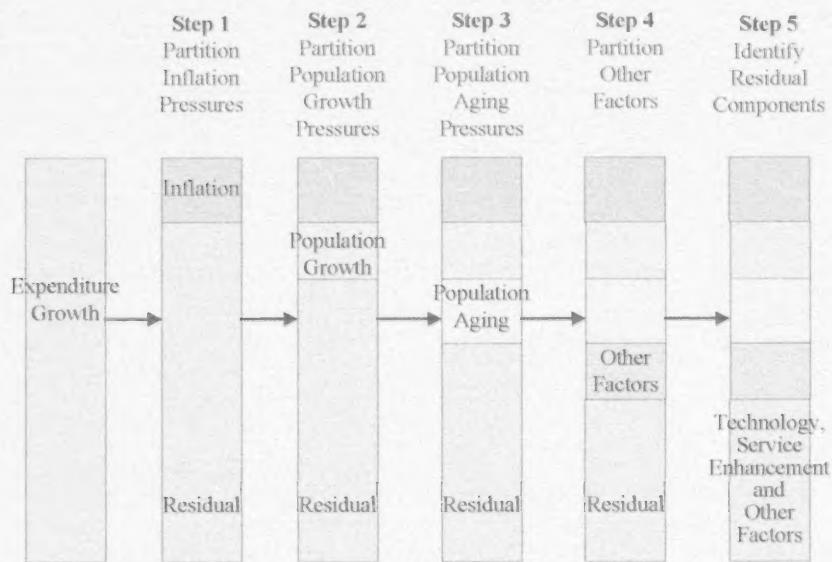
Inflation represents the percentage change in prices and is divided into wage and non-wage components. Wage inflation is calculated by multiplying the annual growth in wages by the share of wage expenditures to total health expenditures. Similarly, non-wage inflation is obtained by multiplying the share of non-wage expenditures to total health expenditures. As noted in the report, inflation effects were calculated for each of the three sectors. In the

⁵³ This was used mainly for the hospital and physician sectors. For the drugs sector, claims data were used to estimate the demographic (population growth + aging) effect.

analysis, inflation is measured through input prices and therefore does not include productivity effects.

Figure A.1: High-Level Overview of the Factor Decomposition Methodology

(Top-Down Approach to Minimize Residual)



B. Assumptions for Projections under Cost Drivers Model

Projections of health expenditures by sector under the cost drivers model were developed based on the results of the factor decomposition analysis described above. As noted earlier, the projections presented in this report are based on a status quo scenario where some of the cost drivers were assumed to remain at their recent historical trends. Table A.1 shows the assumptions for each cost driver by the three major sectors:

Table A.1: Assumptions for each cost driver by the three major sectors

	Physician	Hospital	Drugs
Population Growth	AB Finance Medium population growth projection	AB Finance Medium population growth projection	5-year historical average
Aging	3-year historical average	3-year historical average	5-year historical average
Wage Inflation	3-year historical average	3-year historical average	n.a.
Non-Wage Inflation	3-year historical average	3-year historical average	Incorporates changes to generic drug pricing (via drug price impact)
Drug Mix	n.a.	n.a.	5-year historical average
Other Effects (Residual)	3-year historical average	3-year historical average	None

C. Canadian Average Rate Calculations:

The population-based (age-standardized rate) Canada average rate for $Year_i$ = (Total number of cases in analysis cohort of $Year_i$ in Canada / total mid-year population for Canada) $\times 100,000$ (age adjusted).

The Figures in this report had Canada population-based rates as following:

- Figure 11: Counts of RNs and LPNs per 100,000 Population by Province, 2011; and
- Figure 12: Age-Standardized Ambulatory Care Sensitive Conditions Rates per 100,000 Population, 2010-11.

The risk-adjusted Canada average rate for $Year_i$ = (Total number of numerators cases in the analysis cohort for $Year_i$, all Canada) / (The total denominator cases in the same analysis cohort for $Year_i$, all Canada) * 100.

The Figures in this report had Canada risk-adjusted rates as following:

- Figure 9: 30-Day Acute Myocardial Infarction (AMI) Readmission; and
- Figure 10: 30-Day Medical Readmission Risk-Adjusted Rate by Province, 2010-11.

D. Interprovincial Comparison on Selected Statistics and Indicators

	Alberta	Canada	Notes, incl. AB ranking
Government Health Spending¹ (Fiscal year)			
Total Provincial Government Health Spending			
Average Growth Rate (2000/2001-2010/2011)	10.4%	7.0%	Highest
As % of Total Provincial Government Program Spending, 2010/2011	40%	38%	4 th Highest
By Sector			
Hospital	11.0%	6.7%	Highest
Average growth rate, 2000/2001-2010/2011			
Physician	12.4%	7.6%	Highest
Average growth rate, 2000/2001-2010/2011			
Drugs	9.4%	7.9%	2 nd Highest
Average growth rate, 2000/2001-2010/2011			
Government Health Spending¹ (Per Capita) (Calendar year)			
Per Capita Provincial Government Health Spending \$2010 level	\$4,437	\$3,692	AB 2 nd highest in per cap \$ in 2010, up from 5 th highest in 2000.
Average growth rate, 2000-2010	8.0%	5.9%	
By Sector			
Hospital, \$ 2010 level	\$2,010	\$1,477	Per cap \$: AB ranking rose from 5 th to 2 nd between 2000 and 2010.
Average growth rate, 2000-2010	8.6%	5.8%	
Physician, \$ 2010 level	\$863	\$779	Per cap \$: AB ranking rose from 5 th to 1 st between 2000 and 2010.
Average growth rate, 2000-2010	9.6%	6.4%	
Drugs, \$ 2010 level	\$308	\$296	Per cap \$: AB ranking rose slightly from 4 th to 3 rd between 2000 and 2010.
Average growth rate, 2000-2010	9.9%	7.9%	

	Alberta	Canada	Notes, incl. AB ranking
Per Capita Provincial Government Health Spending, Age-Gender Adjusted \$2010 level Average growth rate (2000-2010)	\$4,972 8.3%	\$3,692 6.1%	AB highest in age-gender adjusted per cap \$ in 2010.
Health Sector Compensation			
Average Gross Clinical Payments (FFS+ARP) Per Physician (2010/2011) ¹	\$349,655	\$307,482	Highest
Average Gross FFS Payment Per FTE Physician (2010/2011) ¹ Average Growth Rate in Average Gross FFS Payment Per FTE Physician (2000/2001 – 2010/2011)	\$395,281 6.3%	\$303,125 4.9%	AB highest, 30% higher than national average
Nursing Salary ²	Based on Contract Provisions as of October 4, 2012		
RN, Maximum Hourly Rate	\$45.0	\$38.7	Highest. AB 8% higher than ON and 11% higher than BC.
LPN, Maximum Hourly Rate	\$31.1	Data n.a.	AB 19% higher than BC (ON data n.a.). Ranking not provided as some provinces have two unions with different contract provisions for salary.
Average weekly non-farm wage, October 2012 ³	\$1,103.21	\$910.15	Highest.
Demographics³			
Population Median Age, 2012	36.1 years	40 years	Youngest.
Total Population, Average Annual Growth Rate (2002-2012)	2.2%	1.1%	Highest.
Productivity and Efficiency			
Cost per Weighted Case (CPWC) ¹	\$5,769	\$5,169	2 nd Highest
Total Worked Hours per Weighted Case in	54	50	5 th Highest

	Alberta	Canada	Notes, incl. AB ranking
Nursing Inpatient Service ¹			
30-Day Acute Myocardial Infarction (AMI) Readmission Risk-Adjusted Rate ¹	3.1%	4.1%	Lowest
30-Day Medical Readmission Risk-Adjusted Rate ¹	13.0%	13.4%	7 th Highest
Counts of RNs per 100,000 Population ¹	800	785	8 th Highest
Counts of LPNs per 100,000 Population ¹	204	246	9 th Highest
Ambulatory Care Sensitive Conditions Rate ¹	309	299	7 th Highest
Administrative Costs ¹			
- Administration as % of Total Provincial Government Health Spending, 2012/2013	0.9%	1.2%	9 th Highest
- Administrative Service Expense as % of Total Hospital Expenses, 2009	3.5%	4.8%	Lowest (data n.a. PEI and SK)
Long Term Care - Measures for Operational Efficiency ⁴			2012/13 Target
- People Waiting in Acute/Sub-Acute Beds for Continuing Care Placement	557	n.a.	350
- People Waiting in Community for Continuing Care Placement	938	n.a.	850
- % of People placed in Continuing Care within 30 Days after being assessed	69%	n.a.	n.a.
Utilization ¹	2010/2011		
Average Length of Stay (in days), age-std.	7.9	7.3	6 th highest (tied with NL)
Number of Hospital Inpatient Days Per 1,000 Population*	0.7	0.6	8 th highest (QB data n.a.)
Number of Outpatient Visits Per 100,000 Pop.*			
Emergency Visits Per 100,000 Population	51	36	5 th highest
Day/Night Visits Per 100,000 Population	20	17	6th highest. Day/Night visits pertain to services provided to patients for three or more hours (such as day surgery).

	Alberta	Canada	Notes, incl. AB ranking
Technology¹	2009/2010		
Number of CT Exams Per 1,000 Population	117.2	122.7	8th highest
Number of MRI Exams Per 1,000 Population	50.6	42.1	Highest
Hip replacement rate, age-std/100,000	117	100	3 rd Highest
Knee replacement rate, age-std/100,000	174	160	4 th Highest

¹ Source: CIHI

² Source: Canadian Federation of Nurses Union

³ Source: Statistics Canada

⁴ Source: AHS Quarterly Report –December 2012

* Age-standardized data not available